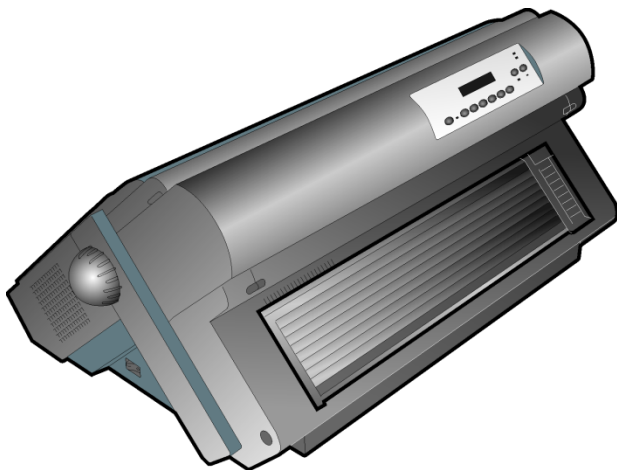


**Compuprint** 9065

**Compuprint** 9080

**Compuprint** 10300

# Programmer Manual



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# Commands

This section provides information about the commands supported by your printer. The commands are organized by function groups. Each command has both a brief and a detailed description.

## General Overview

This appendix provides information about the commands supported by your printer. The commands are organized by function groups. Each command has both a brief and a detailed description.

Each command has the following structure:

- Name and function description. Information about protocol (IBM Proprinter XL24/XL24 AGM, IBM Personal 2391+, EPSON LQ Series, ANSI 3.64).
- The hexadecimal and decimal codes for the command:  $n$  represents variable parameters of the command. The functions of these parameters are explained in its corresponding command description.

## Command Summary in Alphabetical Order

BEL	Buzzer. (IBM/EPSON)	75
BEL	Bell. (ANSI)	132
BS	Print and space back one position. (IBM/EPSON)	75
BS	Back space. (ANSI)	121
CAN	Cancels line. (EPSON)	72
CAN	Cancels data. (IBM)	72
CR	Prints all received data and the column counter is set to the left margin. (IBM/EPSON)	8
CR	Carriage return. (ANSI)	121
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ESC -	Sets or cancels underlined printing. (IBM/EPSON)	29
ESC [ p <sub>1</sub> a	Horizontal position relative (HPR). (ANSI)	122
ESC [ p <sub>1</sub> ;...p <sub>n</sub> h	Sets mode (SM). (ANSI)	134
ESC [ p <sub>1</sub> d	Vertical position absolute (VPA). (ANSI)	126
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ESC [ p <sub>1</sub> ; p <sub>n</sub> l	Resets mode (RM). (ANSI)	135
ESC [ p <sub>1</sub> ; p <sub>n</sub> v	Sets vertical tab stops at specified positions (Multiple Vertical Tab Set – VTS). (ANSI)	129
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ESC Z	Quadruple density dot graphics printing (240 virtual dpi). (IBM/EPSON)	70
ESC[ p <sub>1</sub> ; p <sub>n</sub> u	Sets horizontal tab stops at specified positions multiple horizontal tab set (HTS). (ANSI)	124
FF	Advances paper to the top of the next page. (IBM/EPSON)	26
FF	Form feed. (ANSI)	129
HT	Moves logically the print carriage to the next horizontal tab stop. (IBM/EPSON)	26
HT	Horizontal tab. (ANSI)	123
LF	Line Feed. (IBM/EPSON)	10
LF	Line Feed. (ANSI)	124

NUL	Ignored. (ANSI)	131
SI	Sets compressed printing. (EPSON)	51
SI	Shift in. (ANSI)	120
SI or ESC SI	Sets compressed printing. (IBM/EPSON)	46
SO	Sets double width printing (one line). (IBM/EPSON)	51
SO	Shift out. (ANSI)	119
SO or ESC SO	Sets double width printing (one line). (IBM/EPSON)	47
SP	Space. (ANSI)	121
VT	Advances paper to the next vertical tab stop of the selected VFU channel. (IBM/EPSON)	27
VT	Vertical tab. (ANSI)	128

## EPSON/IBM Mode

The following printer commands are supported by this printer according to the IBM Proprinter XL24-XL24 AGM, IBM 2391+ and EPSON LQ Series.

### Print and Line Feed Execution

---

#### CR

**Prints all received data and the column counter is set to the left margin. (IBM/EPSON)**

ASCII Code	CR
Hexadecimal Value	0D
Decimal Value	13

This code is a terminator code; when received, it causes any data in the buffer to be printed out. The print head then moves logically to the left margin position. The column counter is set to the left margin value and a line feed is inserted automatically after the carriage return (see the automatic carriage return function in the printer setup). The code resets the double width printing set by SO code.

---

#### ESC ]

**Sets a reverse line feed. (IBM)**

ASCII Code	ESC ]
Hexadecimal Value	1B 5D
Decimal Value	27 93

This code is a terminator code; when received, it causes the current contents of the print buffer to be printed out, before reversing the paper by one line at the current vertical spacing. If no data precedes this command or if the preceding data consists of spaces, the code causes only a reverse line feed to be performed. When the line counter is equal to or less than the top of the form value, the ESC ] is ignored.

---

---

## ESC 5

**Sets an automatic line feed after a carriage return. (IBM)**

ASCII Code           ESC 5 *n*  
Hexadecimal Value   1B 35 *n*  
Decimal Value        27 53 *n*

If *n* is equal to 1, this command sets an automatic line feed on receiving of a CR code. If *n* is equal to 0, this command cancels the automatic line feed.

n	Automatic line feed
0	Disabled
1	Enabled

---

## ESC J

**Advances paper *n*/180 inch. (EPSON and IBM XL24 AGM)**

**Advances paper *n*/216 inch. (IBMXL24 and 2391)**

ASCII Code           ESC J *n*  
Hexadecimal Value   1B 4A *n*  
Decimal Value        27 74 *n*  
Range                 $1 \leq n \leq 255$

This is a terminator code; it therefore causes the current contents of the print buffer to be printed out before performing a single line feed of *n*/180 or *n*/216 inch. This command is cancelled after the line feed has been performed. The printing will restart after a line feed from the column at which the command was sent.

## LF

### Line Feed. (IBM/EPSON)

ASCII Code	LF
Hexadecimal Value	0A
Decimal Value	10

This is a terminator code; it therefore causes the current contents of the print buffer to be printed out before advancing the paper by one line at the current vertical spacing. If no data precedes the LF code, or if the preceding data consists of spaces, the code causes only a line feed.

When the line counter reaches the last line of the form (defined by software or function menu), the LF code causes a skip to the first line of the next form. This code cancels the double width printing set by the SO code. In IBM mode, the column counter is set to the first column if the automatic carriage return is selected. In EPSON mode, the column is always set to the first column.

## Format Control

### ESC \$

**Sets the absolute printing position. (EPSON)**

ASCII Code	ESC & $n_1 n_2$
Hexadecimal Value	1B 24 $n_1 n_2$
Decimal Value	27 36 $n_1 n_2$
Range	$0 \leq n_1, n_2 \leq 255$

This command specifies the distance from the left margin where you want to print subsequent characters. The distance is in number of dots and must be calculated using the following formula:

$$\text{Margin distance} = n_1 + (n_2 \times 256)$$

where  $n_2$  is the integer result of the number of dots divided by 256 and the  $n_1$  is the remainder. 1 dot = 1/60 inch. If the selected position is outside the current right margin, the sequence will be ignored.

### ESC [ \

**Sets vertical units. (IBM)**

ASCII Code	ESC [ \ $m_1 m_2 t_1 \dots t_4$
Hexadecimal Value	1B 5B 5C $m_1 m_2 t_1 \dots t_4$
Decimal Value	27 91 92 $m_1 m_2 t_1 \dots t_4$
Range	$m_1 = 4$ $m_2 = 0$ $0 \leq t_1 \leq 255$ $0 \leq t_2 \leq 255$ $t_3 = 0$ $t_4 = 180 \text{ or } 216$

This command changes the base units for the graphics line spacing commands (ESC J, ESC 3). The default is 1/216 or 1/180 inch.

## ESC /

**Selects the Vertical Format Unit (VFU) channel. (EPSON)**

ASCII Code	ESC / $m$
Hexadecimal Value	1B 2F $m$
Decimal Value	27 47 $m$
Range	$0 \leq m \leq 7$

This sequence selects the VFU channel that you want to use. Eight different channels are available. The parameter  $m$  represents the channel that you want to select.

## ESC \

**Sets the relative dot position. (EPSON)**

ASCII Code	ESC \ $n_1 n_2$
Hexadecimal Value	1B 5C $n_1 n_2$
Decimal Value	27 92 $n_1 n_2$
Range	$0 \leq n_1, n_2 \leq 255$

This command specifies the distance between the current print head position and the position where you want to print subsequent characters (relative position). The distance is in number of dots and must be calculated using the following formula:

Current position distance =  $n_1 + (n_2 \times 256)$

where  $n_2$  is the integer result of the number of dots divided by 256 and the  $n_1$  is the remainder. The unit of the dots is 1/120 inch for Draft printing or 1/180 inch for Letter Quality. If the distance is negative (Most Significant Bit of  $n_2$  equal to 1), the print head will be moved to the left of the current position by a number of dots equal to the complement on two of  $n_1 + (n_2 \times 256)$ .



---

## ESC 0

**Sets vertical spacing to 1/8 inch. (IBM/EPSON)**

ASCII Code	ESC 0
Hexadecimal Value	1B 30
Decimal Value	27 48

This code causes vertical spacing to be set to 1/8 inch.

---

## ESC 1

**Sets vertical spacing to 7/72 inch. (IBM)**

ASCII Code	ESC 1
Hexadecimal Value	1B 31
Decimal Value	27 49

This command causes vertical spacing to be set to 7/72 inch.

---

## ESC +

**Sets  $n/360$ -inch line spacing. (IBM)**

ASCII Code	ESC + $n$
Hexadecimal Value	1B 2B $n$
Decimal Value	27 43 $n$
Range	$0 \leq n \leq 255$

This command sets the line spacing to  $n/360$  inch. If the line spacing is changed, it does not affect previous settings for vertical tabs or page length.

---

## ESC 2

**Sets the vertical spacing to 1/6 inch. (EPSON)**

ASCII Code	ESC 2
Hexadecimal Value	1B 32
Decimal Value	27 50

This command causes the vertical spacing to be set to 1/6 inch.

---

## ESC 2

**Enables the vertical spacing set by ESC A. (IBM)**

ASCII Code	ESC 2
Hexadecimal Value	1B 32
Decimal Value	27 50

This command enables the vertical spacing sets by ESC A.

---

## ESC 3

**Sets vertical spacing to  $n/180$  inch. (IBM XL24 AGM, EPSON)**

ASCII Code	ESC 3 $n$
Hexadecimal Value	1B 33 $n$
Decimal Value	27 51 $n$
Range	$1 \leq n \leq 255$

This sequence sets the vertical spacing to  $n/180$  inch. It is ignored if  $n$  is equal to 0.

---

## ESC 3

**Sets vertical spacing to  $n/216$  inch. (IBM XL24, 2391 +)**

ASCII Code	ESC 3 $n$
Hexadecimal Value	1B 33 $n$
Decimal Value	27 51 $n$
Range	$0 \leq n \leq 255$

This sequence sets the vertical spacing to  $n/216$  inch.

---

## ESC 4

**Sets the current position as top of form (first printable line). (IBM)**

ASCII Code	ESC 4
Hexadecimal Value	1B 34
Decimal Value	27 52

This sequence sets the first line of the fanfold paper as the current paper position of the form.

## ESC A

**Sets variable vertical spacing to  $n/60$  inch. (IBM XL24 AGM, EPSON)**

ASCII Code	ESC A $n$
Hexadecimal Value	1B 41 $n$
Decimal Value	27 65 $n$

This command changes the default vertical spacing to  $n/60$  inch. The new vertical spacing value is immediately activated.

## ESC A

**Sets variable vertical spacing to  $n/72$  inch. (IBM XL24, 2391 +)**

ASCII Code	ESC A $n$
Hexadecimal Value	1B 41 $n$
Decimal Value	27 65 $n$

This command changes the default vertical spacing to  $n/72$  inch. The vertical spacing value is stored and activated only after the ESC 2 code is received.

## ESC B

**Sets vertical tab stops. (IBM/EPSON)**

ASCII Code	ESC B $n_1 \dots n_x 0$
Hexadecimal Value	1B 42 $n_1 \dots n_x 00$
Decimal Value	27 66 $n_1 \dots n_x 0$
Range	$1 \leq n \leq 255$

In EPSON mode, sets vertical tab stops in the 0 Vertical Format Unit (VFU) channel. This code sets up to 16 vertical tab stops at the line specified by  $n_1$ ,  $n_2$  and so on in the 0 VFU channel. The tab stops are memorized as physical positions. In IBM modes, this code sets up to 64 vertical tab stops at the line number specified by  $n_1$ ,  $n_2$  and so on in the 0 VFU channel. The tab stops are memorized as logical positions.

## ESC B NUL

**Resets vertical tab stops. (IBM/EPSON)**

ASCII Code	ESC B NUL
Hexadecimal Value	1B 42 00
Decimal Value	27 66 00

Resets vertical tab stops in the 0 Vertical Format Unit (VFU) channel.

---

## ESC b

**Sets vertical tab stops in one of the 8 Vertical Format Unit channels available. (EPSON)**

ASCII Code	ESC b $m$ $n_1$ ... $n_x$ 0
Hexadecimal Value	1B 62 $m$ $n_1$ ... $n_x$ 00
Decimal Value	27 98 $m$ $n_1$ ... $n_x$ 0
Range	$0 \leq m \leq 7$ $1 \leq n_1 \dots n_x \leq 255$

This sequence sets vertical tabulations in the VFU channel specified by the parameter  $m$ .

The VFU channel can be imagined as a blank page where you can set up to 16 vertical tabulations in order to format your page as you like. 8 channels are available and in each of them you can create a sample page that you can recall later.  $n_1$  to  $n_{16}$  specify the lines at which vertical tabulations must be set.

The values of  $n$  must be in ascending order. If you change the vertical spacing, the vertical tabulations set are not cancelled and they maintain their physical position on the page.

The vertical tabulations set in the channel specified by the  $m$  parameter are executed by the VT code when the specific channel is selected by the ESC / command, this code is executed as a line feed.

---

## ESC b NUL

**Resets vertical tab stops in one of the 8 Vertical Format Unit channels available. (EPSON)**

ASCII Code	ESC b NUL
Hexadecimal Value	1B 62 00
Decimal Value	27 98 0

Resets vertical tab stops in one of the 8 Vertical Format Unit channels available.

---

## ESC C 0 *n*

**Sets form length to *n* inches. (IBM/EPSON)**

ASCII Code	ESC C 0 <i>n</i>
Hexadecimal Value	1B 43 00 <i>n</i>
Decimal Value	27 67 0 <i>n</i>
Range	$1 \leq n \leq 24$

This command sets the form length to the number of inches specified by *n*. The current position of the paper is assumed as top of form.

---

## ESC C *n*

**Sets form length to *n* lines. (IBM/EPSON)**

ASCII Code	ESC C <i>n</i>
Hexadecimal Value	1B 43 <i>n</i>
Decimal Value	27 67 <i>n</i>
Range	$1 \leq n \leq 255$

This command sets the form length to the number of lines specified by *n* at the current vertical spacing. The current position of the paper is assumed as top of form.

---

## ESC D

**Sets horizontal tab stops.**

ASCII Code	ESC D $n_1 n_2 \dots n_x 0$
Hexadecimal Value	1B 44 $n_1 n_2 \dots n_x 00$
Decimal Value	27 68 $n_1 n_2 \dots n_x 0$
Range	$1 \leq n \leq 255$

This sequence sets up to 28 (IBM mode) or 32 (EPSON mode) horizontal tab stops after canceling the current setting. The  $n_1$  to  $n_x$  parameters specify the number of columns at which horizontal tab stops are required and must be entered in the sequence in ascending numerical order. Any value outside this range will be ignored. In IBM mode, the tab stop position is memorized as logical position in the page so that it is affected by changing the horizontal spacing. The columns are numbered 1 through 136. In EPSON mode, the tab stop position set by ESC D is memorized as physical position in the page and therefore it is not affected by changing the horizontal spacing. The physical position of the tab stop depends on the horizontal spacing in operation when ESC D is used. The ESC D 0 cancels all active tab stops.

## ESC d

**Spaces forwards relative dot position. (IBM)**

ASCII Code	ESC d $n_1 n_2$
Hexadecimal Value	1B 64 $n_1 n_2$
Decimal Value	27 100 $n_1 n_2$
Range	$0 \leq n_1, n_2 \leq 255$

This command moves the print carriage of a  $(n_1 + (n_2 * 256)) / 120$  inch displacement on the right of its current dot position. If the selected position is outside the current right margin, it is forced to the last column.

## ESC e

### Spaces backward relative dot position. (IBM)

ASCII Code	ESC e $n_1 n_2$
Hexadecimal Value	1B 65 $n_1 n_2$
Decimal Value	27 101 $n_1 n_2$
Range	$0 \leq n_1, n_2 \leq 255$

This command moves the print carriage of a  $(n_1 + (n_2 * 256)) / 120$  inch displacement on the left of its current dot position. If the selected position is outside the current left margin, it is forced to the first column.

## ESC I

### Sets left margin. (EPSON)

ASCII Code	ESC I $n$
Hexadecimal Value	1B 6C $n$
Decimal Value	27 108 $n$
Range	$0 \leq n \leq 255$

This code sets the left margin at the current horizontal spacing. It must be sent at the beginning of the line. The  $n$  parameter specifies the number of columns. For each type of horizontal spacing there is a different range of possible values, as shown in the following table:



Character Width	Horizontal Spacing	Range of columns
Double Width	5	$0 \leq n \leq 67$
	6 cpi	$0 \leq n \leq 80$
	7.5 cpi	$0 \leq n \leq 100$
	8.5 cpi	$0 \leq n \leq 114$
	10 cpi	$0 \leq n \leq 134$
Normal	10 cpi	$0 \leq n \leq 134$
	12 cpi	$0 \leq n \leq 160$
	15 cpi	$0 \leq n \leq 201$
	17 cpi	$0 \leq n \leq 229$
	20 cpi	$0 \leq n \leq 255$
	24 cpi	$0 \leq n \leq 255$

Any value outside the accepted range is ignored and the previous setting remains in effect. The left margin must be smaller than the right margin. The physical position set for the left margin does not change if the horizontal spacing is modified. This command overrides the menu setting.

## ESC N

Sets the skipover perforation to  $n$  lines. (IBM/EPSON)

ASCII Code	ESC N $n$
Hexadecimal Value	1B 4E $n$
Decimal Value	27 78 $n$
Range	$1 \leq n \leq 127$ (EPSON mode) $1 \leq n \leq 225$ (IBM mode)

The skipover perforation is the sum of top and bottom margins values at the selected vertical spacing. The  $n$  parameter must be less than the current form length. The skipover is memorized as physical position on the page. It is cancelled by ESC O or changing the form length.

The skipover value, when accepted, will set the top and bottom margins according to the operator panel setting (see *User Manual* in this CD-ROM):

If the top margin set via operator panel is greater than the skipover value, then the following value of the margins will be set:

Top margin = skipover value

Bottom margin = 0

If the top margin set via operator panel is less or equal to the skipover value, then the following value of the margins will be set:

Top margin = operator panel value

Bottom margin = the difference between skipover value and top margin value

If the sum of the top and bottom margins values set via operator panel is less than the skipover value, the following values for the margins will be set:

Top margin = operator panel value

Bottom margin = the difference between skipover value and top margin value

Changing the vertical spacing does not affect the skipover distance. This can be changed by a further ESC N command or can be reset by the ESC O command, which resets the skipover value to 0. The skipover perforation will be executed when the end of the page is reached with a LF, VT or FF code and not with the ESC J or ESC C command, the skipover perforation is cancelled and must therefore be set again.

---

## ESC O

**Disables the skipover perforation. (IBM/EPSON)**

ASCII Code	ESC O
Hexadecimal Value	1B 4F
Decimal Value	27 79

This sequence sets the number of lines of the skipover perforation to the value *O* and so any skip perforation set by ESC N is cancelled.

---

## ESC Q

**Sets the right margin. (EPSON)**

ASCII Code	ESC Q <i>n</i>
Hexadecimal Value	1B 51 <i>n</i>
Decimal Value	27 81 <i>n</i>
Range	$1 \leq n \leq 225$

This code sets the line length at the current horizontal spacing. It must be sent at the beginning of the line.

The *n* parameter specifies the number of columns and for each type of horizontal spacing there is a range of values, as shown in the following table:

Character Width	Horizontal Spacing	Range of columns
Double Width	5 cpi	$1 \leq n \leq 67$
	6 cpi	$1 \leq n \leq 81$
	7.5 cpi	$1 \leq n \leq 101$
	8.5 cpi	$1 \leq n \leq 116$
	10 cpi	$1 \leq n \leq 135$
Normal	10 cpi	$1 \leq n \leq 135$
	12 cpi	$1 \leq n \leq 162$
	15 cpi	$1 \leq n \leq 203$
	17 cpi	$1 \leq n \leq 232$
	20 cpi	$1 \leq n \leq 255$
	24 cpi	$1 \leq n \leq 255$

Any value outside the accepted range is ignored and the previous setting remains in effect. The right margin must be greater than the left margin. The physical position set for the right margin does not change if the horizontal spacing is modified.

## ESC R

**Sets horizontal and vertical tab stops to default values. (IBM)**

ASCII Code	ESC R
Hexadecimal Value	1B 52
Decimal Value	27 82

This command sets horizontal tab stops every eight columns starting from column 9 and cancels all vertical tab stops.

## ESC SP

### Sets intercharacter space. (EPSON)

ASCII Code	ESC SP $n$
Hexadecimal Value	1B 20 $n$
Decimal Value	27 32 $n$
Range	$0 \leq n \leq 255$

This command sets the intercharacter space to  $n/120$  inch in Draft printing and  $n/180$  inch in Quality printing.

## ESC X

### Sets left and right margins. (IBM)

ASCII Code	ESC X $n_1 n_2$
Hexadecimal Value	1B 58 $n_1 n_2$
Decimal Value	27 88 $n_1 n_2$
Range	$0 \leq n_1 \leq 134$ (left margin) $2 \leq n_2 \leq 136$ (right margin)

This command sets the left and right margins simultaneously. The  $n_1$  and  $n_2$  parameters indicate respectively the number of columns for the left and right margins at the current spacing. These margins are memorized in terms of absolute displacement from the physical left edge of the page. Use a CR immediately after ESC X  $n$  to establish the print head position relative to the new margin setting.

If  $n_1$  is equal to 0, the current left margin of the page is used. If  $n_2$  is equal to 1, the current right margin of the page is used. The left margin value must be less than the right margin value. The right margin value must not exceed the physical right edge of the paper; otherwise the maximum acceptable value for the right margin will be set.

## FF

**Advances paper to the top of the next page. (IBM/EPSON)**

ASCII Code	FF
Hexadecimal Value	0C
Decimal Value	12

This code is a terminator code, when received, causes all data in the print buffer to be printed out. Then it advances the paper to the first printable line of the next form. The line counter is set to the first line value and the column counter is set to the left margin value. This code cancels the double width printing set by SO code.

## HT

**Moves logically the print carriage to the next horizontal tab stop. (IBM/EPSON)**

ASCII Code	HT
Hexadecimal Value	09
Decimal Value	9

This code moves logically the print carriage to the next horizontal tab stop as defined by ESC D. Up to 28 (IBM mode) or 32 (EPSON mode) horizontal tab stops can be set. The HT code is ignored if no tab stop has been set or if the current print carriage position has moved past the last tab position or if the tab stop is on or beyond the right margin. At power on, the tab stops are set every eight columns (default).

In EPSON mode, the default tab stops are memorized as logical position in the page, so that are affected by changing the horizontal spacing. The tab stop positions set by ESC D are memorized as physical position in the page and therefore they are not affected by changing the horizontal spacing. When the double width printing is selected, the tab stop setting must take account that each character occupies two columns. In IBM mode, the tab stops, both, default and set by ESC, are memorized as logical position in the page, so that are affected by changing the horizontal spacing. The horizontal tab stops can be changed by the ESC D command.

## VT

**Advances paper to the next vertical tab stop of the selected VFU channel. (IBM/EPSON)**

ASCII Code	VT
Hexadecimal Value	0B
Decimal Value	11

This code is a terminator code and when received causes the contents of the print buffer to be printed before advancing paper to the next vertical tab stop set by the ESC B or the ESC b commands.

This code will be executed normally, if vertical tab stops follow the current print position. It will be executed like a FF code (EPSON mode) or like a LF code (IBM mode), if the vertical tab stops follow the bottom of form position (which corresponds to the form length if the bottom of form has not been set) or if the current position is beyond the last vertical tab stop. It will be executed like a LF code if no vertical tab stops have been set by the ESC B or ESC b commands.

In EPSON mode, the vertical tabulations are referred to the VHF channel selected by the ESC / m. If no VFU channels have been selected, the printer assumes as default channel 0.

This command resets the double width printing set by SO or ESC SO command.

## Print Mode

---

### DC2

**Sets 10 cpi printing. (IBM)**

ASCII Code	DC2
Hexadecimal Value	12
Decimal Value	18

This is a terminator code. It causes all data present in the print buffer to be printed. This command is accepted at any position within the line. The character that follows this command will be printed at 10 cpi.

---

### DC2

**Cancels compressed printing. (EPSON)**

ASCII Code	DC2
Hexadecimal Value	12
Decimal Value	18

This is a terminator code. It causes all data present in the print buffer to be printed. This command is accepted at any position within the line. The character that follows this command will be printed as follows:

17 CPI	→	10 CPI
20 CPI	→	12 CPI



---

## DC4

**Cancels double width printing. (IBM/EPSON)**

ASCII Code	DC4
Hexadecimal Value	14
Decimal Value	20

This code cancels the double width printing set by SO or ESC SO code. It has no effect if the ESC W or ESC ! command has set double width.

---

## ESC -

**Sets or cancels underlined printing. (IBM/EPSON)**

ASCII Code	ESC - <i>n</i>
Hexadecimal Value	1B 2D <i>n</i>
Decimal Value	27 45 <i>n</i>

Enables or disables the underlined printing.

See the following table:

n	Underlined Printing
1	enabled
0	disabled

---

## ESC !

### Sets printing style. (EPSON)

ASCII Code           ESC ! *n*  
Hexadecimal Value   1B 21 *n*  
Decimal Value        27 33 *n*

This command is used to select any valid combination of the printing attributes. Each printing attribute is selected by the *n* parameter, as specified in the following page:

n	Attribute
0	10 cpi
1	12 cpi
2	Proportional
4	Compressed
8	Emphasized
16	Double Strike
32	Double Width
64	Italics
128	Underline

To print the desiderated combination of printing attributes, calculate the *n* parameter by adding up the values of each attribute.

## ESC ( -

### Sets score line. (EPSON)

ASCII Code	ESC ( - $n_1 n_2 m d_1 d_2$
Hexadecimal Value	1B 28 2D $n_1 n_2 m d_1 d_2$
Decimal Value	27 40 45 $n_1 n_2 m d_1 d_2$
Range	$n_1 = 3$ $n_2 = 0$ $m = 1$ $1 \leq d_1 \leq 3$ $d_2 = 0, 1, 2, 5, 6$

This command enables/disables scoring of all characters and spaces following this command according to the following parameters:

$d_1$	Line
1	Underline
2	Strikethrough
3	Overscore

$d_2$	Line
0	Cancel score line
1	Single continuous line
2	Double continuous line
5	Single broken line
6	Double broken line

Any combination of scoring may be simultaneously. Each type is independent of other types. Graphics characters are not scored.

## ESC [ -

**Selects the score line. (IBM 2391 + only)**

ASCII Code	ESC [ - $n_1 n_2 loc type$
Hexadecimal Value	1B 5B 2D $n_1 n_2 loc type$
Decimal Value	27 91 45 $n_1 n_2 loc type$
Range	$n_1 = 2$ $n_2 = 0$

This command selects several forms of overscore, underscore and strikethrough.

To select *loc*:

To select *type*:

loc	Selection	type	Selection
1	Underscore	0	Cancels line
2	Strikethrough	1	Single line
3	Overscore	2	Double line
		255	Cancels all score selections

## ESC :

**Sets 12 CPI. (IBM)**

ASCII Code	ESC :
Hexadecimal Value	1B 3A
Decimal Value	27 58

This is a terminator code. It causes all data present in the print buffer to be printed. Subsequent data will be printed at 12 cpi. This command is accepted at any position within the line. The setting of another horizontal spacing resets this command.

## ESC <

**Prints characters for one line from left to right. (EPSON)**

ASCII Code	ESC <
Hexadecimal Value	1B 3C
Decimal Value	27 60

This command causes the printing of one line from left to right.

---

## ESC [ @

**Selects the printing type style. (IBM 2391 + only)**

ASCII Code	ESC [ @ 4 0 $m_1$ 0 $m_3$ $m_4$
Hexadecimal Value	1B 5B 40 04* 00* $m_1$ 00* $m_3$ $m_4$
Decimal Value	27 91 64 4 0 $m_1$ 0 $m_3$ $m_4$

(\*) These values are constants.

This command is used to modify the type style of the character and the number of line spacing. Use this command for:

1. Italic printing
2. Single-high character
3. Double-high character
4. Single-wide character
5. Double-wide character
6. Single Line Feed
7. Double Line Feed

These selections may be combined: italic print with double height, doublewide character and double line feed.

See the following tables for  $m_1$ ,  $m_3$  and  $m_4$  selections:

$m_1$	Selection
0	No Change
1	Start Italic Printing
2	Stop Italic Printing
4	Start Outline
8	Stop Outline
16	Start Shadow
32	Stop Shadow

$m_3$	Selection
0	No Change
1	Single-High Character
2	Double-High Character
16	Single Line Feed
32	Double Line Feed

$m_4$	Selection
0	No Change
1	Single-Wide Character
2	Double-Wide Character
16	Single Line Feed
32	Double Line Feed

## ESC [ @

**Sets double high printing and double line feed. (IBM)**

ASCII Code           ESC [ @  $l\ h\ m_1\ m_2\ m_3\ m_4$

Hexadecimal Value   1B 5B 40  $l\ h\ m_1\ m_2\ m_3\ m_4$

Decimal Value        27 91 64  $l\ h\ m_1\ m_2\ m_3\ m_4$

$l$  = normally 4,  $h$  = normally 0,  $m_1 = 0$ ,  $m_2 = 0$

This command sets height, width and vertical spacing.

The  $l$  and  $h$  parameters specify the number of mode bytes  $m_x$  contained in the sequence.

The  $m_3$  and  $m_4$  parameters specify the printing characteristics.

The  $m_3$  parameter controls both the line spacing and the character height. It has two parts: a high-order half-byte of  $m_3$  controls the line spacing and the low-order half-byte controls the character height.

$m_3$	Character Height	Line Spacing
0	No change	No change
1	Standard character height	Line feeds unchanged
2	Double character height	Line feeds unchanged
16	Character height unchanged	Normal line feeds
17	Standard character height	Normal line feeds
18	Double character height	Normal line feeds
32	Character height unchanged	Double line feeds
33	Standard character height	Double line feeds
34	Double character height	Double line feeds

The  $m_4$  parameter specifies the character width. Only the low-order half-byte is significant in this mode byte. The high-order half-byte is ignored.

$m_4$	Character Width	Line Spacing
0	No change	No change
1	Standard width character	No change
2	Double width character	No change

## ESC [ d

Set the print quality. (IBM 2391+ only)

ASCII Code           ESC [ d 1 0  $n$   
Hexadecimal Value   1B 5B 64 01 00  $n$   
Decimal Value        27 91 100 1 0  $n$

This command sets the print quality to Draft or LQ print.

$n$	Types
0	No change
From 64 to 127	Draft
From 128 to 254	Letter Quality
255	Initialization on NVRAM values



## ESC [ I

**Sets font and pitch of a character. (IBM 2391 + only)**

ASCII Code            ESC [ I 2 0 *m n*  
 Hexadecimal Value    1B 5B 49 02 00 *m n*  
 Decimal Value        27 91 73 2 0 *m n*

This command allows modifying the font and pitch type style of a character.

The values 2 and 0 are constants. If font and pitch locks are active, this command is ignored. To select the values for the variables *m* and *n*, which identify the pitch and the font type style to use, refer to the table below.

1. Identify the type style (pitch and font) to use in the left column (pitch).
2. For the hexadecimal values for *m n*, look across the row to the second column (Hex *m n*).
3. For the decimal values for *m n*, look across the row to the third column (Decimal *m n*).
4. Substitute these values for *m n* in the printer command syntax.

Pitch	Hexadecimal		Decimal		Dec. Value ( <i>m</i> x 256 + <i>n</i> )
	<i>m</i>	<i>n</i>	<i>m</i>	<i>n</i>	
<i>Courier</i>					
10	00	0B	0	11	11
12	01	EB	1	235	491
15	01	EC	1	236	492
17	01	ED	1	237	493
20	01	EE	1	238	494
24	01	1E	1	30	286

Pitch	Hexadecimal		Decimal		Dec. Value ( $m \times 256 + n$ )
	$m$	$n$	$m$	$n$	
<i>Gothic</i>					
10	00	24	0	36	36
12	01	8F	1	143	399
15	01	8E	1	142	398
17	01	8D	1	141	397
20	01	8C	1	140	396
24	01	20	1	32	288
PS	01	AE	1	174	174

Pitch	Hexadecimal		Decimal		Dec. Value ( $m \times 256 + n$ )
	$m$	$n$	$m$	$n$	
<i>Script</i>					
10	01	D4	1	212	468
12	01	D5	1	213	469
15	01	D6	1	214	470
17	01	D7	1	215	471
20	01	D8	1	216	472
24	01	24	1	36	292
PS	00	C8	0	200	200

---

## ESC \_

### Sets or cancels overscore printing. (IBM)

ASCII Code           ESC \_ *n*  
Hexadecimal Value   1B 5F *n*  
Decimal Value        27 95 *n*

Enables or disables the overscore printing. See the following table:

n	Overscore Printing
1	Enabled (all spaces and characters that follow are overscored)
0	Disabled

---

## ESC 4

### Sets italics printing mode. (EPSON)

ASCII Code           ESC 4  
Hexadecimal Value   1B 34  
Decimal Value        27 52

Sets the style attribute of the font to italic. This command selects italic printing even if the italic character table is not selected.

---

## ESC 5

### Cancels italics printing. (EPSON)

ASCII Code           ESC 5  
Hexadecimal Value   1B 35  
Decimal Value        27 53

Sets the style attribute of the font to normal (cancels the italic style attribute previously selected with the ESC 4 command).

---

## ESC a

### Sets Letter Quality justification printing. (EPSON)

ASCII Code           ESC a *n*  
Hexadecimal Value   1B 61 *n*  
Decimal Value        27 97 *n*  
Range                 $0 \leq n \leq 3$

Selects from four types of justification, as follows:

n	Justification
0	Left
1	Centered
2	Right
3	Allows an uniform printing between the margins when the buffer is full.

---

## ESC E

**Sets emphasized printing. (IBM/EPSON)**

ASCII Code	ESC E
Hexadecimal Value	1B 45
Decimal Value	27 69

This command starts emphasized printing. The print head strikes each dot twice to produce a darker, bolder character. The second strike is offset horizontally.

---

## ESC F

**Cancels emphasized printing. (IBM/EPSON)**

ASCII Code	ESC F
Hexadecimal Value	1B 46
Decimal Value	27 70

This command ends emphasized printing. This escape sequence cancels emphasized printing that was started by ESC E.

---

## ESC G

**Sets double strike printing. (IBM/EPSON)**

ASCII Code	ESC G
Hexadecimal Value	1B 47
Decimal Value	27 71

This command starts double-strike printing. ESC G may be canceled by ESC H.

---

## ESC g

### Sets 15 CPI. (EPSON)

ASCII Code	ESC g
Hexadecimal Value	1B 67
Decimal Value	27 103

Subsequent data will be printed at 15 cpi. This command is accepted at any position within the line. If you change the pitch during proportional mode (selected with the ESC p command) the change takes effect when the printer exits proportional mode.

---

## ESC H

### Cancels double strike printing. (IBM/EPSON)

ASCII Code	ESC H
Hexadecimal Value	1B 48
Decimal Value	27 72

This command cancels double-strike printing with the ESC G command.

---

## ESC I

### Selects printing type for resident and DLL characters. (IBM)

ASCII Code	ESC I <i>n</i>
Hexadecimal Value	1B 49 <i>n</i>
Decimal Value	27 73 <i>n</i>

This command selects the resident or the download font in Draft or LQ printing mode. It is ignored if you select a font that has not been downloaded or has been overwritten.

See the following table:

n	Resident font	n	Download font
0	Draft 10 cpi	4	Draft 10 cpi
2	LQ 10 cpi	6	LQ 10 cpi
3	Proportional	7	Proportional
8	Draft 12 cpi	12	Draft 12 cpi
10	LQ 12 cpi	14	LQ 12 cpi
16	Draft 17 cpi	20	Draft 17 cpi
18	LQ 17 cpi	22	LQ 17 cpi

## ESC M

**Selects 10.5 point, 12 CPI. (EPSON)**

ASCII Code	ESC M
Hexadecimal Value	1B 4D
Decimal Value	27 77

This is a terminator code. It causes all data present in the print buffer to be printed. Subsequent data will be printed at 12 cpi if you previously set the compressed spacing by sending the SI or ESC SI command. If you select the proportional printing, this command is stored.

---

## ESC P

### Selects 10.5 point, 10 cpi. (EPSON)

ASCII Code	ESC P <i>n</i>
Hexadecimal Value	1B 50 <i>n</i>
Decimal Value	27 80 <i>n</i>

This command selects 10.5-point, 10-cpi character printing. If you change the pitch during proportional mode (selected with the ESC p command) the change takes effect when the printer exits proportional mode.

---

## ESC P

### Sets or cancels proportional printing. (IBM)

ASCII Code	ESC P <i>n</i>
Hexadecimal Value	1B 50 <i>n</i>
Decimal Value	27 80 <i>n</i>
Range	$1 \leq n \leq 255$

This code is a terminator code; when received it causes all data in the print buffer to be printed out. Then if *n* parameter is equal to 1, the subsequent data is printed in proportional mode. If *n* parameter is equal to 0, proportional mode is reset. If the any horizontal spacing command is sent to the printer when the proportional printing is set, the command will be stored and will be activated as soon as the proportional printing will be reset.



---

## ESC p

Sets or cancels proportional printing. (EPSON)

ASCII Code	ESC p <i>n</i>
Hexadecimal Value	1B 70 <i>n</i>
Decimal Value	27 112 <i>n</i>
Range	$1 \leq n \leq 255$

This command selects the proportional or fixed spacing according to the following values:

n	Proportional Printing
0	Returns to current fixed character pitch
1	Selects proportional character spacing

The changes made to the fixed-pitch setting with ESC P, ESC M or ESC g commands during proportional mode take effect when the printer exits proportional mode. The printer automatically switches to LQ mode when the printer exits proportional mode.

---

## ESC S

**Sets subscript or superscript printing. (IBM/EPSON)**

ASCII Code           ESC S *n*  
Hexadecimal Value   1B 53 *n*  
Decimal Value        27 83 *n*

Selects the subscript or the superscript printing. See the following table:

n	Selection
1	Subscript Print enabled
0	Superscript Print enabled

The proportional printing of the subscript or superscript characters is performed at 2/3 of the proportional character width. Use the ESC T command to cancel super/subscript printing.

---

## SI or ESC SI

**Sets compressed printing. (IBM/EPSON)**

ASCII Code           SI or ESC SI  
Hexadecimal Value   0F or 1B 0F  
Decimal Value        15 or 27 15

This command is accepted at any position within the line. The setting of this command depends on the horizontal spacing previously set:

10 CPI           →   17 CPI  
12 CPI           →   20 CPI  
Proportional   →   ½ width

DC2 code cancels the compressed printing.

---

## SO or ESC S0

**Sets double width printing (one line). (IBM/EPSON)**

ASCII Code	SO or ESC S0
Hexadecimal Value	0E or 1B 0E
Decimal Value	14 or 27 14

This code causes subsequent data in the same line to be printed as double width characters. It is canceled by the CR, LF, VT, FF and DC4 codes or when the buffer is full.

---

## ESC s

**Sets and resets Quiet printing. (EPSON)**

ASCII Code	ESC s <i>n</i>
Hexadecimal Value	1B 73 <i>n</i>
Decimal Value	27 115 <i>n</i>

This command controls printing speed as follows:

n	Selection
0	Normal speed printing
1	Quiet speed printing

---

## ESC T

**Cancels subscript or superscript printing. (IBM/EPSON)**

ASCII Code           ESC T  
Hexadecimal Value   1B 54  
Decimal Value        27 84

This command cancels subscript or superscript printing selected by ESC S command.

---

## ESC W

**Sets or cancels double width printing. (IBM/EPSON)**

ASCII Code           ESC W *n*  
Hexadecimal Value   1B 57 *n*  
Decimal Value        27 87 *n*  
Range                 $0 \leq n \leq 1$

Enables or disables the double width printing.

See the following table:

n	Selection
1	Double Width Printing enabled
0	Double Width Printing disabled

---

## ESC w

### Sets or cancels double height printing. (EPSON)

ASCII Code	ESC w <i>n</i>
Hexadecimal Value	1B 77 <i>n</i>
Decimal Value	27 119 <i>n</i>
Range	$0 \leq n \leq 255$

Enables or disables the double-height printing of all characters. The first line of a page is not doubled if the ESC w command is sent on the first line; all following lines are printed at double-height. Double-height printing overrides super/subscript, condensed, super/subscript, condensed. resumes when double-height printing is canceled. See the following table:

n	Selection
1	Double Height Printing enabled
0	Double Height Printing disabled

## ESC x

### Selects Letter Quality or Draft. (EPSON)

ASCII Code	ESC x n
Hexadecimal Value	1B 78 <i>n</i>
Decimal Value	27 120 <i>n</i>

This command selects either LQ or Draft printing according to the following values:

n	Selection
0	Draft printing
1	Letter Quality printing

If you select proportional spacing with the ESC p command during Draft printing, the printer prints an LQ font instead. When you cancel proportional spacing with the ESC p command, the printer returns to Draft printing.

---

## SI

### Sets compressed printing. (EPSON)

ASCII Code	SI
Hexadecimal Value	0F
Decimal Value	15

This command is accepted at any position within the line. DC2 code cancels the compressed printing: The setting of this command depends on the horizontal spacing previously set

10 CPI	→	17 CPI
12 CPI	→	20 CPI
Proportional		½ width

DC2 code cancels the condensed printing.

---

## SO

### Sets double width printing (one line). (IBM/EPSON)

ASCII Code	SO
Hexadecimal Value	0E
Decimal Value	14

This code causes subsequent data in the same line to be printed as double width characters. It is cancelled by the CR, LF, VT, FF and DC4 codes or when the buffer is full.

## Character Set

### ESC [ T

Selects a Code page. (IBM/EPSON)

ASCII Code                ESC [ T 4 0 0 0 *Hc Lc*  
 Hexadecimal Value        1B 5B 54 04 00 00 00 *Hc Lc*  
 Decimal Value            27 91 84 4 0 0 0 *Hc Lc*

This sequence allows changing the current code page. If an unavailable code page is specified, this command is ignored. The digits 04 00 00 00 (hexadecimal) and 4 0 0 0 (decimal) are constant. To calculate *Hc Lc* for a code page that is not shown: If your code page has an alphabetic character, such as 437G, add 10,000 to the code page number, then divide by 256.

- The whole number result is the *Hc* value
- The remainder is the *Lc* value.

Hc	Lc		Hc	Lc		Hc	Lc		Hc	Lc	
1	181	CP437	3	96	CP864	33	143	8859/1	4	229	CP1253
33	122	CP437G	3	97	CP865	33	144	8859/2	4	230	CP1254
33	129	CP437 Slavic	3	98	CP866	33	145	8859/3	4	231	CP1255
3	82	CP850	3	99	CP867	33	146	8859/4	4	232	CP1256
3	83	CP851	3	108	CP876	33	147	8859/5	4	233	CP1257
3	84	CP852	3	109	CP877	33	148	8859/6	33	130	FARSI_1
3	85	CP853	4	74	CP1098	33	149	8859/7	33	131	FARSI_2
3	87	CP855	33	123	96 GREEK	33	150	8859/8			
3	89	CP857	33	124	GOST	33	151	8859/9			
3	90	CP858	33	125	TASS	3	155	8859/15			
3	92	CP860	33	126	MAZOWIA	4	226	CP1250			
3	94	CP862	33	128	UKRANIAN	4	227	CP1251			
3	95	CP863	33	138	KOI8-U	4	228	CP1252			



## ESC \

**Prints characters from all characters table. (IBM)**

ASCII Code	ESC \ $n_1 n_2$
Hexadecimal Value	1B 5C $n_1 n_2$
Decimal Value	27 92 $n_1 n_2$
Range	$0 \leq n_1 \leq 255$ $0 \leq n_2 \leq 255$

This command prints the next  $n_1 + n_2 \times 256$  characters from the table of all printable characters. The total number of characters that will be printed from the table of all printable characters is equal to  $n_1 + (n_2 \times 256)$ . For example, to print 300 characters from the table of all printable characters:  $n_1 = 44$ ,  $n_2 = 1$ .

The control codes are not recognized as long as this sequence is active. The space character is printed as an unassigned character.

## ESC ^

**Prints a single character from the all characters table. (IBM)**

ASCII Code	ESC ^ $n$
Hexadecimal Value	1B 5E $n$
Decimal Value	27 94 $n$
Range	$0 \leq n \leq 255$

This command prints the next character from the all characters table. This sequence prints only one character from the all character table.

---

## ESC 6

### Selects the Character Set 2. (IBM/EPSON)

ASCII Code	ESC 6
Hexadecimal Value	1B 36
Decimal Value	27 54

This command selects the character set 2.

---

## ESC 7

### Selects the Character Set 1. (IBM/EPSON)

ASCII Code	ESC 7
Hexadecimal Value	1B 37
Decimal Value	27 55

This command selects the character set 1.

## ESC k

### Selects the LQ fonts. (EPSON)

ASCII Code	ESC k <i>n</i>
Hexadecimal Value	1B 6B <i>n</i>
Decimal Value	27 107 <i>n</i>

Selects one of the available fonts in Letter Quality. If the Draft mode is selected when this command is sent, the new LQ font will be selected when the printer returns to LQ printing.

**Boldface available if the command ESC p1 (proportional) is sent.**

n	Types	n	Types
1	Gothic	6	OCR-A
2	Courier	7	Presentor
3	Prestige	11	Boldface proportional
4	Script	181	Block Char.
5	OCR-B		

---

## ESC R

### Selects Nation character set. (EPSON)

ASCII Code                ESC R *n*

Hexadecimal Value       1B 52 *n*

Decimal Value            27 82 *n*

Range                     $0 \leq n \leq 13$

This code causes the national character set to be selected according to the parameter *n*. See the following table:

n	National Character Sets	n	National Character Sets
0	USA	7	Spain-I
1	France	8	Japan
2	Germany	9	Norway
3	United Kingdom	10	Denmark-II
4	Denmark-I	11	Spain-II
5	Sweden	12	Latin America
6	Italy		

---

## ESC t

### Selects characters table. (EPSON)

ASCII Code	ESC t <i>n</i>
Hexadecimal Value	1B 74 <i>n</i>
Decimal Value	27 116 <i>n</i>
Range	$0 \leq n \leq 3$

Selects the upper half (from 128 to 255) from the character table.

n	Character Tables
0	Standard Italic Character Set
1	ASCII Character Set
2	Remaps DLL Character Set from position 0-127 to 128-255

---

## Download Character

---

### ESC %

**Selects user-defined character set. (EPSON)**

ASCII Code	ESC % <i>n</i>
Hexadecimal Value	1B 25 <i>n</i>
Decimal Value	27 37 <i>n</i>

This command switches between the normal (resident) and user-defined (downloaded) characters:

n	Selection
1	Selects the use of down-loaded character set in RAM
0	Selects the use of resident character set in ROM

## ESC &

### Defines the 24-pin download characters. (EPSON)

ASCII Code	ESC & NUL $n$ $m$ $a_0$ $a_1$ $a_2$ $d_1 \dots d_x$
Hexadecimal Value	1B 26 00 $n$ $m$ $a_0$ $a_1$ $a_2$ $d_1 \dots d_x$
Decimal Value	27 38 0 $n$ $m$ $a_0$ $a_1$ $a_2$ $d_1 \dots d_x$
Range	$0 \leq n \leq 127$ $0 \leq m \leq 127$ $0 \leq d_x \leq 255$ $a_0$ $a_1$ $a_2$ : see below

This escape sequence is used to download fonts into the printer. Once fonts have been downloaded they can be selected by ESC % n.

Parameter n is the character position of the first character and parameter m is the character position of the last character to be downloaded. For example, to download character “RST” the user would specify n=52H and m=54H. Characters must be downloaded to consecutive positions after the first character. The parameters  $a_0$ ,  $a_1$  and  $a_2$  must be sent for each character being downloaded and are known as the attribute bytes. Parameter  $a_0$  specifies the number of dot columns to be added before the character.

Parameter  $a_1$  specifies the width of the character. Parameter  $a_2$  specifies the number of dot columns to add after the character. The parameters  $d_1 \dots d_x$  represent the dot column data being downloaded for each character. 2 or 3 data bytes represent 1 column of dots depending upon the print mode type as shown below. Draft, Letter Quality and super/subscript fonts can be downloaded. It is necessary to select the desired print mode prior to sending the download data. Each dot column has a width of 1/120” in Draft and 1/360 in Letter Quality. Following are limits of parameters  $a_0$ ,  $a_1$  and  $a_2$  for LQ Draft and Super/Subscript print mode at various character pitches.

	LQ					DRAFT	
	10 cpi	12 cpi	15 cpi	Prop	Script	Norm	Script
$a_1$	29	23	15	39	23	9	7
$a_0 + a_1 + a_2$	36	30	24	42	36	12	12

The mapping of data bits to wires is as follows:

BYTE #	BIT #	LQ WIRE #	DRAFT WIRE #	SUPERSCRIP T WIRE #	SUBSCRIPT WIRE #
1	7	1	1	1	9
	6	2	2	2	10
	5	3	3	3	11
	4	4	4	4	12
	3	5	5	5	13
	2	6	6	6	14
	1	7	7	7	15
	0	8	8	8	16
2	7	9	9	9	17
	6	10	10	10	18
	5	11	11	11	19
	4	12	12	12	20
	3	13	13	13	21
	2	14	14	14	22
	1	15	15	15	23
	0	16	16	16	24
3	7	17	17	NOTE: Only 2 Bytes are required for superscript/subscript characters.	
	6	18	18		
	5	19	19		
	4	20	20		
	3	21	21		
	2	22	22		
	1	23	23		
	0	24	24		



If a data bit has a value of 1, then the corresponding wire is fired. If a data bit has a value of 0, then the wire is not fired. In general the user of this feature must be careful that the number of bytes of downloaded information is equal to 3 x width of the character being defined ( $a_1$ ) or the results will be unpredictable. Only one print mode type may be downloaded at a time. That is, if draft characters have been downloaded, then selecting Letter Quality and downloading characters will cause the draft download characters to be cleared. This applies similarly to script characters.

## ESC :

### Copies characters from ROM to RAM. (EPSON)

ASCII Code           ESC : *NUL n 0*  
 Hexadecimal Value   1B 3A 00 *n 00*  
 Decimal Value        27 58 *n 0*

This code copies the character generator in ROM into RAM area dedicated to the user-defined characters. The *n* parameter represents the LQ typestyle. It copies the data for the characters between 0 and 255 (from the italic character table) of the Courier or Gothic font from ROM to RAM memory according to the following values:

n	Selection	n	Selection
2	Courier	1	Gothic
4	Script	5	OCR-B
6	OCR-A		
182	DLL		

Before copying ROM characters to RAM, cancel italics with the ESC 5 command. After copying you can italicize characters by sending the ESC 4 command.

## ESC =

**Defines downloaded characters. (IBM)**

ASCII Code	ESC = <i>n m id p t</i>
Hexadecimal Value	1B 3D <i>n m id p t</i>
Decimal Value	27 61 <i>n m id p t</i>

This sequence allows you to design and then down-line load special characters not present in the character set in use. Whenever you would like to start the DLL setting procedure, proceed as follows:

- Copy the character generator in ROM into RAM
- Select the DLL generator

There are 256 entries of 9 bytes that compose the look up table of a character generator. One entry describes one character as follows:

Byte 1, 2      The absolute address of the character definition.

Byte 3 :

- Bit 7      *1*: indicates that the character is a graphic character (connects at 6 lpi)  
              *0*: indicates that the character is an alphanumerical character
- Bit 6      *0*: indicates a DLL character  
              *1*: indicates a resident character
- Bit 5 to 0      These 6 bits indicate the effective number of dot columns of the character shape stored in memory.

## Byte 4:

- Bit 7, 6      Graphic character description:
  - 0: shading character
  - 1: line drawing character
  - 10: underscored character
  - 11: not supported

All graphics characters are 30 dot high. An underscored character is defined as a blank graphic (all zeros) and it is automatically generated by the printer. A shading character repeats dots 1-6 of each column as dots 25 through 30 respectively. A line drawing character repeats dots 23 and 24 as the pairs 25 and 26, 27 and 28, 29 and 30.

- Bit 5 to 0    The number of dot columns of the character shape minus one. For example: the character width of Draft generator is 10 dots and bit 5 to 0 must be set to 9.
- Bit 5 to 9    Compression mask description. It is used to optimize the memory occupation and it is based on the concept that a dot column on its left is not stored. You can calculate the compression mask of a character only after designing the entire character. Every bit is associated with a dot column with the bit 7 of byte 5 associated with the leftmost column. The bit is set to {1}, if the column is equal to the preceding one; otherwise, it is set to {0}. If the character is longer than 39 dot columns the remaining dot columns must be stored without compression. The bit 40 (bit 0 of byte 9) must be 0. If no compression is present in the character, byte 5 to 9 is composed by all zeros.

If you wish to copy an entry over another entry so that two characters with the same characteristics and different code are present in the same look up table, the DLL sequence ESC =  $n\ m\ id\ p\ t$  has the following meaning:

- $n$  and  $m$ : Indicate the byte number of the sequence  $n$  is the low part and  $m$  is the high part.
- $id$ : Indicates the printer model. The  $id$  related to your printer is  $23H$ .
- $p$  and  $t$ : Indicate the memory address of the character that you wish to replace.  $p$  is the low part and  $t$  is the high part.
- $data$ : Is the entry *9 bytes* of the character that you want to position at address specified by  $p$  and  $t$ .

## Bit-Image

### ESC \*

**Sets dot graphics printing. (IBM XL24 AGM, EPSON)**

ASCII Code	ESC * $m\ n_1\ n_2\ p_1\ p_2\ \dots\ p_x$
Hexadecimal Value	1B 2A $m\ n_1\ n_2\ p_1\ p_2\ \dots\ p_x$
Decimal Value	27 42 $m\ n_1\ n_2\ p_1\ p_2\ \dots\ p_x$
Range	$0 \leq n_1, n_2 \leq 255$ $0 \leq p_x \leq 255$

Selects 8-dot graphics or 24-dot graphics modes according to the table below: The parameter m determinates the horizontal density as well as the number of wires to be fired.

For the 8-dot images, the total number of data bytes (p) to be sent is determined by the following formula:  $n_1 + n_2 \times 256$ .

m	DPI	# DOTS	DENSITY NAME	Other ESC
0	60	8	Normal density	ESC K
1	120	8	Dual density	ESC L
2	120 (virtual)	8	Double speed, Dual density	ESC Y
3	240 (virtual)	8	Quadruple-density	ESC Z
4	80	8	CTR Graphic I	
6	90	8	CTR Graphic II	

For the 24-dot images, the total number of data bytes ( $p_x$ ) to be sent is determined by the following formula:  $3 \cdot x \cdot (n_1 + n_2 \times 256)$ .

m	DPI	# DOTS	DENSITY NAME
32	60	24	Normal density
33	120	24	Double density
38	90	24	CRT Graphic III
39	180	24	Triple-density
40	360 (virtual)	24	Hex-density

## ESC ?

### Reassigns dot graphics mode. (EPSON)

ASCII Code	ESC ? $n m$
Hexadecimal Value	1B 3F $n m$
Decimal Value	27 63 $n m$

Reassigns one of the dots graphics mode (described in the command ESC \*) to one of the following commands: ESC K, ESC L, ESC Y and ESC Z. The parameter  $n$  specifies a character (K, L, Y or Z) which is reassigned to specific mode  $m = 0,1,2,3$ .

m	n	m	n
0	(K): ESC K graphic command	2	(Y): ESC Y graphic command
1	(L): ESC L graphic command	3	(Z): ESC Z graphic command

## ESC K

### Normal density dot graphics printing (60 dpi). (IBM/EPSON)

ASCII Code	ESC K $n_1 n_2 p_1 p_2 \dots p_x$
Hexadecimal Value	1B 4B $n_1 n_2 p_1 p_2 \dots p_x$
Decimal Value	27 75 $n_1 n_2 p_1 p_2 \dots p_x$
Range	$0 \leq n_1 \leq 255$ $0 \leq n_2 \leq 31$ $0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 60 horizontal dot per inch by 180 vertical dpi.

The parameter values should be calculated as follows:

$n_1$	Remainder of the number of column divided by 256.
$n_2$	Integer result of the previous division.
$p_1$	Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.
$p_2$	Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.
$p_x$	Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.

## ESC L

### Double density dot graphics printing (120 dpi). (IBM/EPSON)

ASCII Code	ESC L $n_1 n_2 p_1 p_2 \dots p_x$
Hexadecimal Value	1B 4C $n_1 n_2 p_1 p_2 \dots p_x$
Decimal Value	27 76 $n_1 n_2 p_1 p_2 \dots p_x$
Range	$0 \leq n_1 \leq 255, 0 \leq n_2 \leq 31, 0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 120 horizontal dot per inch by 180 vertical dpi.

The parameter values should be calculated as follows:

$n_1$	Remainder of the number of column divided by 256.
$n_2$	Integer result of the previous division.
$p_1$	Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.
$p_2$	Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.
$p_x$	Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.



## ESC Y

**Double density dot graphics printing at double-speed graphics (120 virtual dpi). (IBM/EPSON)**

ASCII Code	ESC Y $n_1 n_2 p_1 p_2 \dots p_x$
Hexadecimal Value	1B 59 $n_1 n_2 p_1 p_2 \dots p_x$
Decimal Value	27 89 $n_1 n_2 p_1 p_2 \dots p_x$
Range	$0 \leq n_1 \leq 255, 0 \leq n_2 \leq 31, 0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 120 horizontal dot per inch by 180 vertical dpi.

The parameter values should be calculated as follows:

- $n_1$     Remainder of the number of column divided by 256.
- $n_2$     Integer result of the previous division.
- $p_1$     Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.
- $p_2$     Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.
- $p_x$     Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.

## ESC Z

### Quadruple density dot graphics printing (240 virtual dpi). (IBM/EPSON)

ASCII Code	ESC Z $n_1 n_2 p_1 p_2 \dots p_x$
Hexadecimal Value	1B 5A $n_1 n_2 p_1 p_2 \dots p_x$
Decimal Value	27 90 $n_1 n_2 p_1 p_2 \dots p_x$
Range	$0 \leq n_1 \leq 255, 0 \leq n_2 \leq 31, 0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 240 horizontal dot per inch by 180 vertical dpi.

The parameter values should be calculated as follows:

- $n_1$       Remainder of the number of column divided by 256.
- $n_2$       Integer result of the previous division.
- $p_1$       Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.
- $p_2$       Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.

## ESC [ g

**Selects 8 or 24 needle dot graphics mode. (IBM)**

ASCII Code           ESC [ g /  $h$   $m$   $n_1$  ...  $n_k$   
 Hexadecimal Value   1B 5B 67 /  $h$   $m$   $n_1$  ...  $n_k$   
 Decimal Value       27 91 103 /  $h$   $m$   $n_1$  ...  $n_k$

This command selects dot graphics in 8 or 24 needle configuration.  $h*256+l$  represents the number of data + 1. The  $m$  parameter represents the dot graphics modes as shown in the following table:

m	DENSITY	NEEDLE	FUNCTION
0	60	8	Same as ESC K (8 needles)
1	120	8	Same as ESC L (8 needles)
2	120	8	Same as ESC Y (8 needles)
3	240	8	Same as ESC Z (8 needles)
8	60	24	Same as ESC * (32)
9	120	24	Same as ESC * (33)
11	180	24	Same as ESC * (39)
12	360	24	Same as ESC * (40)

The  $n_1$ ,  $n_2$  up to  $n_k$  parameters are dot graphics data. If you select the 8 needle dot graphics mode, one byte data is needed for each column so that the formulas  $h*256+l = \text{number of columns} + 1$  is valid. If you select the 24 needle dot graphics mode, three bytes data is needed for each column so that the formulas  $h*256+l = \text{number of columns} * 3 + 1$  is valid.

## Data Input Control

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### CAN

#### Cancels line. (EPSON)

ASCII Code	CAN
Hexadecimal Value	18
Decimal Value	24

This code clears all printable characters and bit-image graphics on the current line. This code moves the print position to the left-margin position.

---

### CAN

#### Cancels data. (IBM)

ASCII Code	CAN
Hexadecimal Value	18
Decimal Value	24

This code clears all data stored in the preceding print buffer but does not change the current print position.

---

### DC1

#### Selects printer. (IBM)

ASCII Code	DC1
Hexadecimal Value	11
Decimal Value	17

This command causes the printer to be enabled after it has been disabled by the ESC Q command.

---

---

## DC1

### Selects printer. (EPSON)

ASCII Code	DC1
Hexadecimal Value	11
Decimal Value	17

This command causes the printer to be enabled after it has been disabled by the DC3 command.

---

## DC3

### Deselects printer. (EPSON)

ASCII Code	DC3
Hexadecimal Value	13
Decimal Value	19

This code deselects the printer. The printer remains deselected until it receives a DC1 command or power is turned off then on again. The printer ignores the ESC @ command (initialize printer) when it is deselected.

---

## DEL

### Deletes the last character. (EPSON)

ASCII Code	DEL
Hexadecimal Value	7F
Decimal Value	127

This command causes the printer to delete the last printable character sent to the printer. Printer control codes are not affected. The printer ignores this command if it follows a command that moves the horizontal print position (ESC \$, ESC \ or HT).

---

## **ESC #**

### **Cancels MSB control. (EPSON)**

ASCII Code	ESC #
Hexadecimal Value	1B 23
Decimal Value	27 35

This command cancels any controls on the MSB (bit number 7) set by ESC = or ESC > commands; printer then accepts all MSB data as is.

---

## **ESC =**

### **Sets MSB to 0. (EPSON)**

ASCII Code	ESC =
Hexadecimal Value	1B 3D
Decimal Value	27 61

This command sets the Most Significant bit (bit number 7) of all incoming data to 0. All data is affected including graphics data.

---

## **ESC >**

### **Sets MSB to 1. (EPSON)**

ASCII Code	ESC >
Hexadecimal Value	1B 3E
Decimal Value	27 62

This command sets the Most Significant bit (bit number 7) of all incoming data to 1. All data is affected including graphics data.

## ESC Q

### Deselects Printer. (IBM)

ASCII Code	ESC Q <i>n</i>
Hexadecimal Value	1B 51 <i>n</i>
Decimal Value	27 81 <i>n</i>

This sequence tells the printer not to accept data from the host. The host must reset the printer or select the printer by using DC1 (Select Printer) to accept data. To deselect the printer, use ESC Q35.

## Miscellaneous

---

### BEL

#### Buzzer. (IBM/EPSON)

ASCII Code	BEL
Hexadecimal Value	07
Decimal Value	7

This code sounds the printer's buzzer.

### BS

---

#### Print and space back one position. (IBM/EPSON)

ASCII Code	BS
Hexadecimal Value	08
Decimal Value	8

This code causes the printing to be continued from one column to the left of the current carriage position. The printer ignores this command if it would move the print position to the left of the left margin.

## ESC @

**Initializes the printer. (EPSON)**

ASCII Code	ESC @
Hexadecimal Value	1B 40
Decimal Value	27 64

This sequence causes the printer:

- to go back to the current printer setup settings
- to cancel any selected print attributes
- to reset the column counter
- to set the horizontal tabulations every 8 columns
- to clear all vertical tabulations

Only the selection of Draft/Quality printing, DLL and the selected character generator are maintained.

## ESC [ K

**Sets initial conditions. (IBM 2391 + only)**

ASCII Code	ESC [ K $n_1 n_2$ <i>init id</i>
Hexadecimal Value	1B 5B 4B $n_1 n_2$ <i>init id</i>
Decimal Value	27 91 75 $n_1 n_2$ <i>init id</i>

This command causes the printer to reset to its initial status:

- $n_1, n_2$  The  $n_1$  and  $n_2$  parameters specify the number of bytes in the escape sequence normally,  $n_1 = 2$  and  $n_2 =$  always 0.
- init* The *init* parameter specifies to which condition the printer should initialize, normally  $init = 0, 1, 4, 5, 254, 255$ .



**init**   Description

- 0     Initializes printer to user-default settings. The download font remains unchanged. If parameters are specified, they will overwrite the default settings. If the emulation mode is changed, the download font will be initialized. This command will only copy data from the selected macro, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.
- 1     Initializes printer to user-default settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will only copy data from the selected macro, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.
- 4     Initializes printer to factory settings. The download font remains unchanged. If parameters are specified, they will overwrite the default settings. If the emulation mode is changed, the download font will be initialized. This command will only copy the default settings from ROM, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.
- 5     Initializes printer to factory settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will only copy the default settings from ROM, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.
- 254   Initializes printer to user-default settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will change data stored in the selected macro. It will copy data from the selected macro, add parameter changes, if any, and store in working RAM and in the selected macro.
- 255   Initializes printer to default settings. The download font is initialized. If parameters are specified, they overwrite the default settings. This command will change data stored in the macro's non-volatile RAM. It will copy default settings from ROM, add parameter changes, if any, and store in working RAM and all macros.

*id*      The *id* parameter specifies the printer for which the following parameter bytes are intended. If the ID does not address your printer, the mode bytes that follow are ignored. The ID values are Hex = B6, Dec = 182.

*parm1* Specifies the following functions:

	<i>Bit</i>	<i>Not set</i>	<i>Set</i>
7	Discard byte	Process this byte	Ignore this byte
6	Reserved		
5	Alarm	Alarm enabled	Alarm disabled
4	Automatic CR	No CR on vertical movement	CR on vertical movement
3	Automatic LF	No LF after CR	LF after CR
2	Page length	11 inches	12 inches
1	Slashed zero	Zero without slash	Zero with slash
0	Character set	CS1	CS2

*parm2* Specifies the following functions:

	<i>Bit</i>	<i>Not set</i>	<i>Set</i>
7	Discard byte	Process this byte	Ignore this byte
6	Pass over from CP437-CP850	CP437	CP850
5	Reserved		
4	Reserved		
3	Reserved		
2	Reserved		
1	Line length	13.6 inch	8 inch
0	Reserved		

---

## ESC j

### **Stops printing. (IBM)**

ASCII Code	ESC j <i>n</i>
Hexadecimal Value	1B 6A <i>n</i>
Decimal Value	27 106 <i>n</i>

This command stops the printer. The printer goes offline and BUSY signal is sent to the computer. To place the printer online, press the ON LINE key.

## ESC U

### Sets printing direction. (IBM/EPSON)

ASCII Code           ESC U *n*  
Hexadecimal Value   1B 55 *n*  
Decimal Value        27 85 *n*

Selects bidirectional or unidirectional printing, according to the parameters below:

n	Direction
0	Bidirectional printing
1	Unidirectional (left to right) printing

Unidirectional printing provides better alignment of vertical lines while bidirectional printing is faster.

**ESC [ u n****Bar Codes selection. (IBM/EPSON)**

ASCII Code	ESC [ u n
Hexadecimal Value	1B 5B 75 n
Decimal Value	27 91 117 n

Activates or Cancel ANSI Bar Code mode.

This command is recognized only if the menu option “Bar Code” is set to “Alternative” mode.

n	
0	Exit Bar Code mode
1	Enter Bar Code mode. Subsequent data are barcode data strings as set by ESC [ v n

**ESC [ v n m****Sets Barcode parameters. (IBM/EPSON)**

ASCII Code	ESC [ v n m
Hexadecimal Value	1B 5B 76 n m
Decimal Value	27 91 118 n m

Set ANSI barcode parameters according to the table of the following page. Parameter values that are not supported result in the command being ignored. This command is recognized only if the menu option “BAR CODE” is set to “ALTERNATIVE” mode.

n	Parameter Description	m values	m default
0	Barcode style	see below table	4
1	Barcode height	1-120 (1/12" increments)	12
2	Human readable line	0 = disable, 1 = enable	1
3	Narrow bar width	2-255	3
4	Wide bar width	2-255	7
5	Narrow space width	2-255	3
6	Wide space width	2-255	7
7	Intercharacter space width	2-255	3
8	Rotation and HRC font	0 = no rotation and current font for HRC 1 = 0°, 2 = 90°, 3 = 180°, 4 = 270° rotation and special HRC font	0
9	Horizontal print density	1 = 120, 2 = 144, 3 = 180 dpi	1
10	Check digit	0 = disable, 1 = enable	0
11	HRC font for rotated barcode	3 = OCRA, 4 = OCRB	3
12	Barcode height	0-240 (1/24" increments)	24

*Barcode Style supported:*

<b>m</b>	<b>Style</b>
0	Interleaved 2 of 5
1	Bidirectional 2 of 5
2	Matrix 2 of 5
3	Industrial 2 of 5
4	Code 3 of 9 (default)
5	EAN-8
6	EAN-13
7	Code 11
9	Codabar (default start/stop = a/t)
10	Codabar (default start/stop = b/n)
11	Codabar (default start/stop = c/*)
12	Codabar (default start/stop = d/e)
13	UPC-A
14	UPC-E
15	Code 93
16	Code 128 (subset A, B and C)
17	Code 128 (subset A, B and C)
18	Code 128 (subset A, B and C)
19	MSI
20	UPC 2 Supplemental
21	UPC 5 Supplemental
22	EAN 2 Supplemental
23	EAN 5 Supplemental
50	Postnet

## COMPUPRINT Emulation

This printer according to the Native COMPUPRINT Mode supports the following printer commands.

### Format Control

---

#### DC4 DC4 ESC 1

**Sets vertical spacing  $n/180$  inch. (Compuprint)**

ASCII Code	DC4 DC4 ESC 1 $n$
Hexadecimal Value	14 14 1B 31 $n$
Decimal Value	20 20 27 49 $n$
Range	$0 \leq n \leq 255$

This command sets vertical spacing to  $n/180$  inch for subsequent line feeds.

---

#### DC4 DC4 ESC 3 1

**Sets vertical spacing 12 lines/30 mm. (Compuprint)**

ASCII Code	DC4 DC4 ESC 3 1
Hexadecimal Value	14 14 1B 33 31
Decimal Value	20 20 27 51 49

This command sets vertical spacing to 12 lines per 30 mm.



---

### **DC4 DC4 ESC 3 3**

**Sets vertical spacing to 3 lines/30 mm. (Compuprint)**

ASCII Code                DC4 DC4 ESC 3 3

Hexadecimal Value        14 14 1B 33 33

Decimal Value            20 20 27 51 51

This command sets vertical spacing to 3 lines per 30 mm.

---

### **DC4 DC4 ESC 3 4**

**Sets vertical spacing 4 lines/30 mm. (Compuprint)**

ASCII Code                DC4 DC4 ESC 3 4

Hexadecimal Value        14 14 1B 33 34

Decimal Value            20 20 27 51 52

This command sets vertical spacing to 4 lines per 30 mm.

---

### **DC4 DC4 ESC 3 6**

**Sets vertical spacing 6 lines/30 mm. (Compuprint)**

ASCII Code                DC4 DC4 ESC 3 6

Hexadecimal Value        14 14 1B 33 36

Decimal Value            20 20 27 51 54

This command sets vertical spacing to 6 lines per 30 mm.

---

---

## DC4 DC4 ESC 3 8

**Sets vertical spacing 8 lines/30 mm. (Compuprint)**

ASCII Code	DC4 DC4 ESC 3 8
Hexadecimal Value	14 14 1B 33 38
Decimal Value	20 20 27 51 56

This command sets vertical spacing to 8 lines per 30 mm.

---

## DC4 DC4 ESC A

**Sets the horizontal spacing to 15, 17, 20, 24 CPI. (Compuprint)**

ASCII Code	DC4 DC4 ESC A <i>n</i>
Hexadecimal Value	14 14 1B 41 <i>n</i>
Decimal Value	20 20 27 65 <i>n</i>

This is terminator code and therefore causes the current contents of the print buffer to be printed out. Then, the subsequent characters will be printed at the horizontal spacing specified by the *n* parameter.

n	Spacing
4	15 cpi
5	17 cpi
6	20 cpi
7	24 cpi

## Native Character Set

### DC4 DC4 ESC g

Selects LQ fonts (Compuprint).

ASCII Code	DC4 DC4 ESC g <i>n</i>
Hexadecimal Value	14 14 1B 67 <i>n</i>
Decimal Value	20 20 27 103 <i>n</i>
Range	$0 \leq n \leq 255$

If the down-line loading is selected, the command is stored and will be activated as soon as the down-line loading will be canceled.

**Boldface is available if the ESC p1 (proportional) is sent.**

n	Types	n	Types
1	Gothic	5	OCR-B
2	Courier	6	OCR-A
3	Prestige	7	Presentor
4	Script	11	Boldaface proportional
181	Block Char.	182	DLL

The OCR-A and OCR-B print styles are also selected by the DC4 DC4 ESC S command.

## DC4 DC4 ESC S

Selects character set ISO Character Sets or Code Pages. (Compuprint)

ASCII Code                    DC4 DC4 ESC S *n*  
 Hexadecimal Value        14 14 1B 53 *n*  
 Decimal Value              20 20 27 83 *n*

N	Character Set	n	Character Set
1	ISO 8859/1 Latin 1	137	CP 852 Eastern Europe
2	ISO 8859/2 Latin 2	138	CP 876 OCR-A
3	ISO 8859/3 Latin 3	139	CP 877 OCR-B
4	ISO 8859/4 Latin 4	140	CP 855 Cyrillic
5	ISO 8859/5 Latin/Cyrillic	141	CP 866 Russian
6	ISO 8859/6 Latin/Arabic	142	GOST Cyrillic
7	ISO 8859/7 Latin/Greek	145	CP 437G Greek
8	ISO 8859/8 Latin/Hebrew	146	CP 853 Turkish
9	ISO 8859/9 Latin 5	147	CP 857 Turkish
15	ISO 8859/15 Latin 9	148	CP 867 Turkish
128	CP 437 USA	149	CP 858 Euro PC Multilingual
129	CP 850 Multilingual	199	96 Greek
130	CP 860 Portugal	200	CP 1250
131	CP 863 Canada/France	201	MAZOWIA
132	CP 865 Denmark/Norway	202	CP 1251
133	CP 851 Greek	203	CP 1252
134	CP 862 Hebrew		
135	CP 864 Arabic		
136	TASS Cyrillic		

## Bar Codes

### DC4 DC4 ESC !

#### Bar Code Selection.

ASCII Code            DC4 DC4 ESC ! *h t f F r o q b s B S i E M*

Hexadecimal Value    14 14 1B 21 ! *h t f F r o q b s B S i E M*

Decimal Value        20 20 27 33 ! *h t f F r o q b s B S i E M*

This command is recognized only if the menu option “BAR CODE” is set to “NATIVE” mode.

$h$  = Bar Code Height at  $n/6$ ,  $1 \leq h \leq 30$

$t$  = Standard Bar Code to use

t	Name	
1	8-digits European Article Numbering	EAN-8
2	13-digits European Article Numbering	EAN-13
3	Universal Product Code Type A	UPC-A
4	Universal Product Code Type E	UPC-E
5	UPC/EAN 2 Digit Supplement	UPC-EAN 2
6	UPC/EAN 5 Digit Supplement	UPC-EAN 5
7,8,9	8-digits European Article Numbering	EAN-8
10	General Purpose Bar Code	Code-GP
11	Code 2 of 5 3-BAR (Data Logic)	C25-3BAR
12	Binary Coded Decimal	CODE BCD
13	MSI-Plessey	MSI
14	AIM-USD-8 / Code-11	Code 11
15	AIM-USD-7 / Code-93	Code 93

t	Name	
16	Code 2 of 5 Bidirectional	C25-BID
17	Code 2 of 5 Interleaved	C25-INT
18	Code 2 of 5 Industrial	C25-IND
19	Code 2 of 5 Matrix	C25-MTX
20	Code 3 of 9	Code-39
21	8-digits European Article Numbering	EAN-8
22	Codabar (all types)	CODABAR
23	Code 128	CODE-128
24	USPS-PostNet	POSTNET

$f$  = Readable character printing

$f = 1$  printing enabled

$f = 0$  printing disabled

$F$  = Font selection for the printable characters

F	Selection
0	Selected font by r value
1	Default font for text
2	Special font for OCR-A o OCR-B bar codes according to the t value
3	Special font for OCR-A bar codes
4	Special font for OCR-B bar codes

$r$  = Bar code rotation

$r$	Selection
0	No rotation
1	Rotation at $0^\circ$
2	Rotation at $90^\circ$
3	Rotation at $180^\circ$
4	Rotation at $270^\circ$

$o$  = Check digit inserted as last character of the received string according to the bar code

$q$  = Horizontal graphic density of the bar code

$q$	Selection
0	$1/120''$
1	$1/180''$

$b$  = Narrow bar width in  $n/180''$ ,  $3 < b < 18$

$s$  = Narrow space width in  $n/180''$ ,  $3 < s < 18$

$B$  = Wide bar width in  $n/180''$ ,  $6 < B < 72$

$S$  = Wide space width in  $n/180''$ ,  $6 < S < 72$

$i$  = Spacing between characters in  $n/180''$ ,  $3 < i < 72$

$EM$  = Check sequence terminator

## Bar Code Description

<b>EAN-8</b>	DC4 DC4 ESC! <i>n 1 p EM</i>
	The EAN-8 bar code data field must only contain numeric data, and must be eight bytes long, check digit included. The EAN-8 character repertoire provides 0 to 9 ASCII numeric figures. <i>n</i> indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. <i>p</i> must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed. The range of values for <i>n</i> and <i>p</i> parameters can be increased of 32 dec.
<b>EAN-13</b>	DC4 DC4 ESC! <i>n 2 p EM</i>
	The EAN-13 bar code data field must only contain numeric data, and must be 13 bytes long, check digit included. The EAN-13 character repertoire provides 0 to 9 ASCII numeric figures. <i>n</i> indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. If you want to print the Human Readable Characters, <i>p</i> must have the value 1 (hex. 01); otherwise this value must be NUL (hex. 00). The range of values for <i>n</i> and <i>p</i> parameters can be increased of 32 dec.
<b>UPC-A</b>	DC4 DC4 ESC! <i>n 3 p EM</i>
	The UPC-A bar code data field allows 10 numeric characters plus one system number digit and one check digit, at the leftmost and rightmost positions respectively. The UPC-A character repertoire provides 0 to 9 ASCII numeric figures. <i>n</i> indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. <i>p</i> must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed. The range of values for <i>n</i> and <i>p</i> parameters can be increased of 32 dec.



<b>UPC-E</b>	DC4 DC4 ESC! <i>n 4 p EM</i>
	<p>If 11-digit strings will be received and <i>o</i> check digit field is missing or takes values 0 or 2, question marks will be printed in place of HRC string, when possible; if <i>o</i> field takes value 1, the 12<sup>th</sup> digit is inserted by the printer as result of the internally available algorithm applied to the received string.</p> <p>If 10-digit strings will be received and <i>o</i> check-digit is missing or takes NULL value, question marks will be printed in place of HRC string, if possible; if <i>o</i> field takes value 1, a default 0 System-Digit will be automatically inserted by the printer and the 12<sup>th</sup> digit will also be inserted as result of the internally available algorithm applied to the final string.</p> <p>If the final UPC-A string cannot be compressed to an 8-digits string or the received System-Digit is different than 0 or 1, question marks will be printed in place of HRC string, if possible.</p> <p>LEFT and RIGHT delimiters, the System-Digit and the Check-Digit will be printed as descending bars to make a field to host a 6-digits HRC string and the System-Digit HRC to the left of LEFT delimiter (at about the middle of the symbol) when <i>f</i> field is missing or set to 1; in this case, the Check-Digit will show in HRC to the right of the RIGHT delimiter (at about the middle of the symbol), when <i>o</i> field takes values 2 or 3: it will never show on HRC string otherwise.</p>

<b>UPC-EAN 2</b>	DC4 DC4 ESC! <i>n 5 p EM</i>
	<p>ADD ON-2 bar code data fields contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible.</p> <p>If 3-digit strings will be received within a DC4 DC4 ESC (... EM control sequence and <i>o</i> check-digit option field is missing or takes NULL value, the symbol will encode the first 2 digits and the 3<sup>rd</sup> received digit will be used as check digit, even though this may affect its readability; if <i>o</i> field takes 1 value, the 3<sup>rd</sup> digit is matched versus the internally generated check-digit and question marks will be printed in place of HRC string when mismatching, if possible.</p> <p>If 2-digit strings will be received and <i>o</i> check digit field is missing or takes NULL value, question marks will be printed in place of HRC string, when possible; if <i>o</i> field takes value 1, the check digit will be computed applying the internally available algorithm to the received string in order to properly encode the symbol.</p> <p>If <i>f</i> field is missing or takes value 1, the 2-digits HRC string will be printed above the Bar/Spaces symbol and its height will be part of the overall symbol's height; the check-digit will never show on HRC string. If <i>f</i> field takes value 0, the symbol's encoding will print at full height.</p>

<b>UPC-EAN 5</b>	DC4 DC4 ESC ! <i>n</i> 6 <i>p</i> EM
	<p>ADD ON-5 bar code data fields contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible.</p> <p>If 6-digit strings will be received within a DC4 DC4 ESC (... EM control sequence and <i>o</i> check-digit option field is missing or takes NULL value, the symbol will encode the first 5 digits and the 6<sup>th</sup> received digit will be used as check digit, even though this may affect its readability; if <i>o</i> check digit option takes 1 value, the 6<sup>th</sup> digit is matched versus the internally generated check-digit and question marks will be printed in place of HRC string when mismatching, if possible.</p> <p>If 5-digit strings will be received and <i>o</i> check digit field is missing or takes NULL value, question marks will be printed in place of HRC string, if possible; if <i>o</i> field takes value 1, the check digit will be computed applying the internally available algorithm to the received string in order to properly encode the symbol</p> <p>If <i>f</i> field is missing or takes value 1, the 5-digits HRC string will be printed above the Bar/Spaces symbol and its height will be part of the overall symbol's height; the check-digit will never show on HRC string. If <i>f</i> field takes value 0, the symbol's encoding will print at full height.</p>

<b>CODE GP</b>	DC4 DC4 ESC ! <i>n 10 p EM</i>
	<p>CODE-GP bar code allows bar codes to be constructed from the two basic elements (BAR and SPACE) by sending 0,1 digits: digit 0 produces a BAR and digit 1 produces a SPACE.</p> <p>These two elements may be combined in any sequence, thus giving the possibility of producing bars and spaces of any width that is a multiple of the basic element width. Default bar/spaces width is 1/60" (<math>q = 0,1</math>) but these values may be set by the user according to its specific needs. Data fields do not have a defined format length and contain 0,1 data only; question marks will be printed in place of HRC string otherwise, if possible.</p> <p>No Human Readable Interpretation is possible, hence is the user task to provide a TEXT STRING below or above the bar/space symbol: <i>f</i> field is meaningless. No internal check digit algorithm is available: <i>o</i> field is meaningless.</p>
<b>C25-3BAR</b>	DC4 DC4 ESC ! <i>n 11 p EM</i>
	<p>C25-3BAR bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. If <i>o</i> check digit option field takes 1 value, an internally generated check digit complying with general 2/5 family algorithm will be added to the encoded string: however it will not show on the required HRC string.</p>
<b>Code BCD</b>	DC4 DC4 ESC ! <i>n 12 p EM</i>
	<p>CODE-BCD bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. No internal check digit algorithm is available for this standard: <i>o</i> field is meaningless.</p>

<b>MSI Plessey</b>		DC4 DC4 ESC ! <i>n</i> 13 <i>p</i> EM	
		MSI bar code data fields do not have a defined format length and must contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. To releaf the host from calculating MSI check digits, internal algorithms are provided that are accessible by the host application program giving the proper supported value to <i>o</i> check-digit option field, according to the following options:	
	0	Print the bar code symbol with no printer-generated check digits	
	1	Print the bar code symbol with IBM Modulus-10 check digit - generated by the printer and put at the end of the numeric string: this will be the 2 <sup>nd</sup> check digit, the 1 <sup>st</sup> check digit is IBM Modulus-10 also.	2 Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is IBM Modulus-10 also.
	3	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is NCR Modulus-11: if modulus is 10, it is an error and question marks will be printed in place of HRC string, if possible.	4 Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is IBM Modulus-11: if modulus is 10, it is an error and question marks will be printed in place of HRC string, if possible.

	5	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is the complement to 11 of NCR Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1 check digit is 0.	6	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is the complement to 11 of IBM Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1 check digit is 0.
	7	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is the complement to 11 of NCR Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1. It is an error and question marks will be printed in place of HRC string, if possible.	8	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2 <sup>nd</sup> check digit is IBM Modulus-10, the 1 <sup>st</sup> check digit is the complement to 11 of IBM Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1. it is an error and question marks will be printed in place of HRC string, if possible.
The printer-generated second check digit does not show on required HRC string.				

<b>Code 11</b>	DC4 DC4 ESC ! <i>n 14 p EM</i>
	<p>CODE-11 bar code fields do not have a defined format length and contain data belonging to the character set listed below:</p> <p>0 1 2 3 4 5 6 7 8 9 -</p> <p>Question marks will be printed in place of HRC string otherwise, if possible.</p> <p>This bar-code type defines a variable WIDE/NARROW ratio. This bar code is printed at 1/180" horizontal and vertical graphical printing resolution, to ensure high readability rate. Each digit encodation is separated from the next by a 1/90"-1/60 ", wide default InterCharacter Gap.</p> <p>CODE-11 has unique START/STOP character; the printer generates the couple related to each symbol. It is visually interpreted by an OPEN TRIANGLE and will always appear on the HRC string, because its size is usually varied to signify the number of check digits being used in the particular symbol:</p> <ul style="list-style-type: none"><li>- SMALL open triangle means ONE check-digit</li><li>- LARGE open triangle means TWO check-digit</li></ul> <p>Due to this, <i>f</i> field is meaningless and always defaults to HRC string print.</p>

<b>Code 93</b>	DC4 DC4 ESC ! <i>n 15 p EM</i>
	<p>CODE-93 bar code fields do not have a defined format length and contain data belonging to the standard ASCII character set including control codes.</p> <p>Since GS and EM control codes used within COMPUPRINT DC4 DC4 ESC (... EM “Print bar-code” control sequence are part of the supported character set, the host application must SET THE HIGHER-ORDER BIT of the above control codes, to allow the printer distinguish between encodable data and string terminators.</p> <p>The complete ASCII standard character set is encoded by means of 47 combinations of 9 bar/space narrow elements arranged into 3 variable width bars with their adjacent variable width spaces: each of the bars in the supported combinations can be 1, 2 or 3 modules wide. The START/STOP character has a 4-module wide bar. CODE-93 directly implements the basic subset shown below:</p> <p>0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z-          .SPACES \$ / + %          (\$) (%) (/) (+) (as special control characters)          # (as unique START/STOP character)</p> <p>The other STANDARD-ASCII codes not presented above will be represented by means of a combination of one control character in the above set followed by a symbol in the alphabetical set. The HRC string is printed BELOW the symbol when <i>f</i> field is set to 1, without check digits: ASCII non-printable characters are represented in the “control code” format (e.g. CR is ^M, where ”control” is represented as DARK-SQUARE symbol).</p>



<b>2 of 5</b>	DC4 DC4 ESC! <i>n 16 p EM</i>
<b>Bidirectional</b>	BID-25 bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. If <i>o</i> check digit option field takes 1 value an internally generated check digit will be added to the encoded string, that however will not show on the required HRC string.
<b>2 of 5</b>	DC4 DC4 ESC! <i>n 17 p EM</i>
<b>Interleaved</b>	The 2/5-INTERLEAVED bar code does not have a defined format length. However, the total sum of the characters must be even. <i>n</i> indicates the bar code height and must be in the range 1 to 12. <i>p</i> must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.
<b>2 of 5</b>	DC4 DC4 ESC! <i>n 18 p EM</i>
<b>Industrial</b>	The 2/5 INDUSTRIAL bar code. Data format length is variable and the supported character set only provides ASCII numeric figures 0 to 9. <i>N</i> indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. <i>P</i> must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.

<b>2 of 5 Matrix</b>	DC4 DC4 ESC ! <i>n 19 p EM</i>
	The 2/5 MATRIX bar code. Data format length is variable and the supported character set only provides ASCII numeric figures 0 to 9. <i>N</i> indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. <i>P</i> must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.
<b>Code 39</b>	DC4 DC4 ESC ! <i>n 20 p EM</i>
	<p>The CODE 39 bar code. Data format length is variable and must always start and end with an asterisk. It can contain the alphanumeric character listed below:</p> <p>0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z -. SPACE \$ / + % * (as start / stop character)</p> <p>The parameter indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. The <i>p</i> parameter must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.</p>

<b>CODABAR</b>	DC4 DC4 ESC! <i>n 22 p EM</i>
	<p>The Codabar bar code data fields do not have a defined format length and contain data belonging to the character set listed hereafter:</p> <p>0 1 2 3 4 5 6 7 8 9 - \$: / . +  A B C D E N T * a b c d e n t (only as START/STOP characters)</p> <p>The printer allows any combination of START/STOP characters. If the first and last characters of the received string do not belong to the START/STOP characters subset, question marks will be printed in place of HRC string, if possible</p>
<b>CODE 128</b>	DC4 DC4 ESC ! <i>n 23 p EM</i>
	<p>The CODE-128 bar code data fields do not have a defined format length and contain data belonging to the standard ASCII character set, including control codes. Since GS and EM control codes used within the Compuprint DC4 DC4 ESC (...EM "Print Bar Code" control sequence are part of the supported character set, the host application must SET THE HIGHER-ORDER BIT of the above control codes to allow the printer distinguish between encodable data and string terminators.</p>
<b>POSTNET</b>	DC4 DC4 ESC! <i>n 24 p EM</i>
	<p>The POSTNET bar code data fields contain only numeric data and do not have a defined format length. POSTNET bar codes have no HRC string printed and the LOW/TALL bars that encode the symbol comply with the U.S.P.S standard; whatever will be <i>p</i> field value.</p>

---

## DC4 DC4 ESC (GS)

### Prints bar code symbols (Compuprint)

ASCII Code	DC4 DC4 ESC (GS $n_1$ data GS $n_2$ data ... EM
Hexadecimal Value	14 14 1B 28 1D $n_1$ data ... 19
Decimal Value	20 20 27 40 29 $n_1$ data... 25
Range	$1 \leq n \leq 12$ $0 \leq p \leq 1$

This command is recognized only if the menu option “BAR CODE” is set to “NATIVE” mode.

This sequence causes the bar code symbol to be printed according to the previous selection. If you want to print more than one bar code symbol of the same type and height, *GS n* defines the distance from the beginning of the line or between two bar code symbols in multiples of 1/60 or 1/90 of inch depending upon the selected barcode density (120 or 180 dpi). At the end of the line, *EM* must close this command.

## Miscellaneous

---

### DC4 DC4 ESC @

#### Re-initializes the printer. (Compuprint)

ASCII Code	DC4 DC4 ESC @
Hexadecimal Value	14 14 1B 40
Decimal Value	20 20 27 64

This command resets the printer mode and clears the buffer of printable data.

## DC4 DC4 ESC J

### Sets amplification factor. (Compuprint)

ASCII Code	DC4 DC4 ESC J <i>h v</i>
Hexadecimal Value	14 14 1B 4A <i>h v</i>
Decimal Value	20 20 27 74 <i>h v</i>

This command sets the required amplification factor to be applied to the current font.

*h* It is the horizontal amplification factor, the value range is 1 to 4. It is applied to the basic symbols.

*v* It is the vertical amplification factor, the value range is 1 to 4.

0 values for either *h* and *v* parameters keep the related current amplification factor unchanged.

The internally available symbol's amplification algorithms support the following character attributes, that may be selected by means of the available control sequences within the currently active emulation: double width, double-height, emphasized, double strike, subscript, superscript, italics, proportional, compressed.

Doublewide and double-high attributes must be lower than 2.

---

## DC4 DC4 ESC N

**Selects/loads or parks the fanfold from the Front 2 path. (Compuprint)**

ASCII Code                DC4 DC4 ESC N *n*

Hexadecimal Value        14 14 1B 4E *n*

Decimal Value            20 20 27 78 *n*

Range                     $0 \leq n \leq 1$

n	Selection
0	Selects and loads the fanfold from the Front 2 path. If the paper is present (cut sheets or fanfold), the printer automatically parks this fanfold that is not requested before loading the new one (after having pressed the <b>PARK</b> key in response to the <b>TEAR IF NECESS/PARK PAPER</b> message).
1	Parks the fanfold loaded from the Front 2 path to allow the tear off function (after having pressed the <b>PARK</b> key in response to the <b>TEAR IF NECESS/PARK PAPER</b> message).

---

## DC4 DC4 ESC p

### Sets quality printing. (Compuprint)

ASCII Code            DC4 DC4 ESC p *n*

Hexadecimal Value    14 14 1B 70 *n*

Decimal Value        20 20 27 112 *n*

n	Selection
0	High Speed Draft
1	Best Draft
2	Normal Draft
3	NLQ
4	LQ
5	DLL

---

## DC4 DC4 ESC R

### String rotation. (Compuprint)

ASCII Code            DC4 DC4 ESC R *n string EM*

Hexadecimal Value    14 14 1B 52 *n string EM*

Decimal Value        20 20 27 82 *n string EM*

This command sets the string rotation according to the following table.

n	Selection
0	No rotation.
1	Rotation at 0°
2	Rotation at 90°
3	Rotation at 180°
4	Rotation at 270°

## DC4 DC4 ESC r

### Digit rotation. (Compuprint)

ASCII Code                DC4 DC4 ESC r  
Hexadecimal Value        14 14 1B 72  
Decimal Value             20 20 27 144

This command is used to set the required character rotation to be applied to the selected font.

n	Selection
0	No rotation.
1	Rotation at 0°
2	Rotation at 90°
3	Rotation at 180°
4	Rotation at 270°



---

## DC4 DC4 ESC T

Selects/loads or parks the fanfold from the Front1 path. (Compuprint)

ASCII Code            DC4 DC4 ESC T *n*  
Hexadecimal Value    14 14 1B 54 *n*  
Decimal Value        20 20 27 84 *n*  
Range                 $0 \leq n \leq 1$

n	Selection
0	Selects and loads the fanfold from the Front1 path. If the paper is present (cut sheet/fanfold), the printer automatically parks this fanfold that is not requested before loading the new one (after having pressed the PARK key in response to the TEAR IF NECESS/PARK PAPER message).
1	Parks the fanfold loaded from the Front1 path to allow the tear off function (after having pressed the PARK key in response to the TEAR IF NECESS/PARK PAPER message).

---

## DC4 DC4 ESC Y

**Selects emulation. (Compuprint)**

ASCII Code            DC4 DC4 ESC Y *n*  
Hexadecimal Value    14 14 1B 59 *n*  
Decimal Value        20 20 27 89 *n*

Selects the printer emulation type according to the *n* parameter value:

n	Emulation
0	Default printer emulation
1	EPSON LQ Series
2	IBM Proprinter XL 24
4	IBM Proprinter XL 24 AGM
5	IBM 2391+

---

## DC4 DC4 ESC Z

**Makes AGA in column. (Compuprint)**

ASCII Code            DC4 DC4 ESC Z *n*  
Hexadecimal Value    14 14 1B 5A *n*  
Decimal Value        20 20 27 90 *n*

The parameter *n* is the column number at 10 cpi where the AGA (Automatic Gap Adjustment) is made

---

## DC4 DC4 ESC u

Selects the user macros. (Compuprint)

ASCII Code	DC4 DC4 ESC u <i>n</i>
Hexadecimal Value	14 14 1B 75 <i>n</i>
Decimal Value	20 20 27 117 <i>n</i>
Range	$0 \leq n \leq 4$

n	Selection
1	Selects User Macro 1
2	Selects User Macro 2
3	Selects User Macro 3
4	Selects User Macro 4

---

## DC4 DC4 ESC v

Selects graphics print speed. (Compuprint)

ASCII Code	DC4 DC4 ESC v <i>n</i>
Hexadecimal Value	14 14 1B 76 <i>n</i>
Decimal Value	20 20 27 118 <i>n</i>

n	Selection
0	Selects graphics print at low speed and high density (180 dpi vertical)
1	Selects graphics print at high speed and low density (90 dpi vertical)

---

## DC4 DC4 ESC D

**Sends the operator panel messages to the serial I/F . (Compuprint)**

ASCII Code            DC4 DC4 ESC D *n*  
Hexadecimal Value    14 14 1B 44 *n*  
Decimal Value         20 20 27 68 *n*

This command enables or disables the sending of the operator panel messages to the serial I/F. The string to send is the following: *STX “message (16 ASCII byte-characters)”EXT* .

n	Selection
0	enabled
1	disabled

## ANSI Emulation Commands

The following printer commands are supported by this printer according to the ANSI X3.64 emulation.

**Most dimensional parameters in ANSI protocol are expressed in "decipoints". For example:**

1 decipoint = 1/720 inch 72 decipoints = 1/10 inch 120 decipoints = 1/6 inch 720 decipoints = 1 inch 2880 decipoints = 4 inches
---

**All parameter values must be expressed as ASCII numeric rather than binary values.**

**Parameters, within commands with multiple parameters, must be separated by a semicolon ";".**

**See *BASIC Program Sample* and result printed by the printer.**

## Character Set Control

### ESC [ p<sub>1</sub> x

Selects national character set (Select National Characters - SNC).

ASCII Code	ESC [ p <sub>1</sub> x
Hexadecimal Value	1B 5B p <sub>1</sub> 78
Decimal Value	27 91 p <sub>1</sub> 120

This command selects the national character set table according to the p<sub>1</sub> parameter value. See the following tables:

#### *7-bit Substitution*

p <sub>1</sub>	NATION	p <sub>1</sub>	NATION
0	USA	12	Danish/Norwegian D
1	Germany	13	Swedish/Finnish A
2	French A	14	Swedish/Finnish B
3	French B	15	Swedish/Finnish C
4	French Canadian	16	Swedish/Finnish D
5	Netherlands	17	Switzerland
6	Italian	18	USA (ISO)
7	United Kingdom	19	Yugoslavia
8	Spanish	20	United Kingdom A
9	Danish/Norwegian A	21	Turkey
10	Danish/Norwegian B	22	Greece
11	Danish/Norwegian C	25	Cyrillic

**See ANSI National Variation table.**

*8-bit Substitution*

<b>p1</b>	<b>CHARACTER SETS</b>	<b>p1</b>	<b>CHARACTER SETS</b>
437	Code Page 437	8570 to 8575	Reserved
850	Code Page 850	8576	Mazowia
851	Code Page 851	8577	Turkish
852	Code Page 852	8578	Greek
853	Code Page 853	8579	Kamenicky
855	Code Page 855	8580	CWI
858	Code Page 858 (Euro symbol included)	8581	Roman-8
860	Code Page 860	8582	IN2
863	Code Page 863	8583	Code Page 864E
864	Code Page 864	8584	Reserved
865	Code Page 865	8585	Bulgarian
866	Code Page 866	8586 to 8590	Reserved
867	Code Page 867	8591	ISO 8859-1 Western Europe
1250	Code Page 1250	8592	ISO 8859-2 Eastern Europe
1251	Code Page 1251	8593	ISO 8859-3 Southern Europe
1252	Code Page 1252	8594	ISO 8859-4 Northern Europe
1253	Code Page 1253	8595	ISO 8859-5 Cyrillic
1254	Code Page 1254	8596	ISO 8859-6 Arabic
1255	Code Page 1255	8597	ISO 8859-7 Greek
1256	Code Page 1256	8598	ISO 8859-8 Hebrew
1257	Code Page 1257	8599	ISO 8859-9 Southern Europe 2
5915	ISO 8859-15 (Euro symbol included)	8600 to 8700	Reserved for other ISO Tables

**See Character Code Tables.**

---

## Character Pitch and Print Modes

---

### ESC [ p<sub>1</sub>;**....**p<sub>n</sub> m

Select **graphics rendition (SGR)**.

ASCII Code	ESC [ p <sub>1</sub> ; <b>....</b> p <sub>n</sub> m
Hexadecimal Value	1B 5B p <sub>1</sub> 3B...p <sub>n</sub> 6D
Decimal Value	27 91 p <sub>1</sub> 59...p <sub>n</sub> 109

This command selects fonts, pitch, print modes, character styles and colors according to the parameter settings:

<b>p</b>	<b>DEFINITION</b>
0	Normal Print Mode
1	Bold Print Mode
2	Subscript Mode
3	Superscript Mode
4	Underline Mode
5	Expanded Mode
6	Proportional
7	Italic Mode
8 9	Reserved
10	Draft Font
11	Draft Font
12	LQ Gothic
13	Draft Font



<b>p</b>	<b>DEFINITION</b>
14	LQ Courier
15	Draft Italic
16	LQ Gothic Italic
17	Draft Italic
18	LQ Courier Italic
19	Draft
20	Reserved
21	Double Underline Mode
22	Cancel Bold Mode
23	Reserved
24	Cancel Underline Mode (Single & Double)
25	Cancel Expanded Mode
26	Cancel Proportional Mode
60	High speed draft at 10 cpi
61	LQ Courier at 10 cpi
62	LQ Prestige at 10 cpi
63	LQ Script at 10 cpi
64	LQ OCR-A at 10 cpi
65	LQ OCR-B at 10 cpi
66	LQ Courier at 10 cpi
67	LQ Courier at 10 cpi
68	LQ Courier at 10 cpi

<b>p</b>	<b>DEFINITION</b>
70	LQ Courier at 10 cpi
71	LQ Courier at 10 cpi
72	LQ Courier at 10 cpi
73	LQ Courier at 10 cpi

Subscript and Superscript modes are enabled via *System Menu* (ANSI OPTIONS-S/SCRIPT YES). Refer to the *User's Manual* on the CD-Rom.

---

## **ESC [ p<sub>1</sub>; p<sub>2</sub> SP B**

### **Graphic size modification (GSM).**

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> SP B
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 20 42
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 32 66

This command sets the height and/or width of expanded and oversized characters.

The p<sub>1</sub> and p<sub>2</sub> parameters are the percentages by which the height and width, respectively, will be multiplied. The default value of p<sub>1</sub> and p<sub>2</sub> is 100%.

The maximum expansion factor is 18700 for oversize mode and 800 for expanded mode, respectively.

---

## ESC [ p<sub>1</sub> t

**Special print mode (Oversize/Expanded/Bar code Mode - SPM).**

ASCII Code	ESC [ p <sub>1</sub> t
Hexadecimal Value	1B 5B p <sub>1</sub> 74
Decimal Value	27 91 p <sub>1</sub> 116

This sequence selects/deselects oversize expanded or bar code mode according to the p<sub>1</sub> parameter value.

See the table below:

p <sub>1</sub>	FUNCTION
0	Cancel special mode
1	Select oversize mode
2	Select expanded mode
3	Select bar code mode

It can select just one special print mode at a time.

---

## SO

**Shift out.**

ASCII Code	SO
Hexadecimal Value	0E
Decimal Value	14

This code enables Expanded/Oversize mode as determined by the last received ESC [p<sub>1</sub> t command.

---

## SI

### Shift in.

ASCII Code	SI
Hexadecimal Value	0F
Decimal Value	15

This code disables the Expanded/Oversize modes determined by the last received ESC [p] t command.

---

## ESC [ p<sub>1</sub>; p<sub>n</sub> {

### Unidirectional printing (UDP).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> {
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 7B
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 123

This command selects the unidirectional or bi-directional printing according to the p parameter values:

p	FUNCTION
0	Cancel unidirectional printing
1	Print unidirectional LQ and DP
2	Print unidirectional Dot Graphics

## Horizontal Movements

---

### BS

#### Back space.

ASCII Code	BS
Hexadecimal Value	08
Decimal Value	8

The BS code moves the print head one character to the left at the current cpi.

---

### CR

#### Carriage return.

ASCII Code	CR
Hexadecimal Value	0D
Decimal Value	13

This code causes the print head to be moved to the left margin on the current line.

---

### SP

#### Space.

ASCII Code	SP
Hexadecimal Value	20
Decimal Value	32

This code will position one character space to the right of the print position.

## ESC [ p<sub>1</sub> '

### Horizontal position absolute (HPA).

ASCII Code	ESC [ p <sub>1</sub> '
Hexadecimal Value	1B 5B p <sub>1</sub> 60
Decimal Value	27 91 p <sub>1</sub> 96

This command causes the print position to be moved to the decipoint location specified by p<sub>1</sub>. This sequence can be used to print within the left, top and bottom margins.

## ESC [ p<sub>1</sub> a

### Horizontal position relative (HPR).

ASCII Code	ESC [ p <sub>1</sub> a
Hexadecimal Value	1B 5B p <sub>1</sub> 61
Decimal Value	27 91 p <sub>1</sub> 97

This command causes the print position to be moved to the right relative to the current position. The p<sub>1</sub> parameter specifies the number of decipoints. This command cannot be used to move beyond the right margin.

## ESC [ p<sub>1</sub>; p<sub>2</sub> s

### Left/right margin set (SLR).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> s
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 73
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 115

This command sets the left and right margin values. The p<sub>1</sub> parameter specifies the decipoint value of the left margin. The p<sub>2</sub> parameter specifies the decipoint value of the right margin value. The default value for the left margin is 0 while for the right margin it is the maximum width supported by the printer configuration (that is 13.6\*720=9792).

## ESC [ p<sub>1</sub> j

### Horizontal position backward (HPB).

ASCII Code	ESC [ p <sub>1</sub> j
Hexadecimal Value	1B 5B p <sub>1</sub> 6A
Decimal Value	27 91 p <sub>1</sub> 106

This command causes the current horizontal position to be moved backwards as specified by the p<sub>1</sub> parameter (decipoints).

## HT

### Horizontal tab.

ASCII Code	HT
Hexadecimal Value	09
Decimal Value	9

This code causes the print head to be moved to the next tab stop.

## ESC H or HTS

### Horizontal tab setting.

ASCII Code	ESC H or HTS
Hexadecimal Value	1B 48 (7-bit) or 88 (8-bit)
Decimal Value	27 72 (7-bit) or 136 (8-bit)

This command causes a horizontal tab stop to be set to the decipoint value of the current print position.

---

## ESC[ p<sub>1</sub>; p<sub>n</sub> u

Sets horizontal tab stops at specified positions multiple horizontal tab set (HTS).

ASCII Code	ESC[ p <sub>1</sub> ; p <sub>n</sub> u
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 75
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 117

This command sets up to 22 horizontal tab stops at each decipoint position specified by p parameters. When specifying more than one position, enter the parameters in ascending order.

## Vertical Movements

---

### LF

Line feed.

ASCII Code	LF
Hexadecimal Value	0A
Decimal Value	10

This code positions the paper one line space as indicated by the current line spacing value.

---

## ESC D or IND

Index.

ASCII Code	ESC D or IND
Hexadecimal Value	1B 44 (7-bit) or 84 (8-bit)
Decimal Value	27 68 (7-bit) or 132 (8-bit)

This command causes the paper to be positioned down one line space as indicated by the current line spacing value.



---

## ESC E or NEL

### Next line.

ASCII Code	ESC E or NEL
Hexadecimal Value	1B 45 (7-bit) or 85 (8-bit)
Decimal Value	27 69 (7-bit) or 133 (8-bit)

This command causes the paper to be positioned down one line space as indicated by the current line spacing value. The column counter is reset to the left margin value.

---

## ESC K or PLD

### Partial line down.

ASCII Code	ESC K or PLD
Hexadecimal Value	1B 4B (7-bit) or 8B (8-bit)
Decimal Value	27 75 (7-bit) or 139 (8-bit)

This command causes the paper to be positioned down one half line space at the current line spacing value. This may create an appearance of subscripting. This sequence is also used after an ESC L (partial line up sequence) to recover the original active vertical position.

---

## ESC L or PLU

### Partial line up.

ASCII Code	ESC L or PLU
Hexadecimal Value	1B 4C (7-bit) or 8C (8-bit)
Decimal Value	27 76 (7-bit) or 140 (8-bit)

This command causes the paper to be positioned up one half line space at the current line spacing value. This may create an appearance of superscripting. This sequence is also used after an ESC K (partial line down sequence) to recover the original active vertical position.

## ESC M or RI

### Reverse index.

ASCII Code	ESC M or RI
Hexadecimal Value	1B 4D (7-bit) or 8D (8-bit)
Decimal Value	27 77 (7-bit) or 141 (8-bit)

This command causes the paper to be positioned up one line space at the current line spacing value.

## ESC [ p<sub>1</sub> d

### Vertical position absolute (VPA).

ASCII Code	ESC [ p <sub>1</sub> d
Hexadecimal Value	1B 5B p <sub>1</sub> 64
Decimal Value	27 91 p <sub>1</sub> 100

This command causes the current vertical position to be set to the decipoint value specified by the p<sub>1</sub> parameter relative to the top most line of the current form length. This sequence can be used to print within the top and the bottom margins.

## ESC [ p<sub>1</sub> e

### Vertical position relative (VPR).

ASCII Code	ESC [ p <sub>1</sub> e
Hexadecimal Value	1B 5B p <sub>1</sub> 65
Decimal Value	27 91 p <sub>1</sub> 101

This command causes the current vertical position to be advanced to the position specified by the p<sub>1</sub> parameter (in decipoints) relative to the current print line position.

## **ESC [ p<sub>1</sub>; p<sub>2</sub> f**

**Horizontal and vertical position absolute (HVP).**

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> f
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 66
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 102

This command causes the current print position to be moved to the vertical (p<sub>1</sub>) and horizontal (p<sub>2</sub>) decipoint locations specified relative to the top left corner of the page.

This sequence can be used to print within the right, left, top and bottom margins.

---

## **ESC [ p<sub>1</sub> k**

**Vertical position backward (VPB).**

ASCII Code	ESC [ p <sub>1</sub> k
Hexadecimal Value	1B 5B p <sub>1</sub> 6B
Decimal Value	27 91 p <sub>1</sub> 107

This command causes the current vertical position to be moved backwards as specified by the p<sub>1</sub> parameter (decipoints) relative to the current print line position.

---

## ESC [ p<sub>1</sub>; p<sub>n</sub> g

### Tab clear (TBC).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> g
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 67
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 103

This command clears horizontal & vertical tab stops. If no parameter is present, the horizontal tab stop at the current position is cleared (default).

p	DESCRIPTION
0 (default)	Clear horizontal tab at current position
1	Clear vertical tab at current position
3	Clear all horizontal tab stops
4	Clear all vertical tab stops

---

## VT

### Vertical tab.

ASCII Code	VT
Hexadecimal Value	0B
Decimal Value	11

This code causes printing to be moved to the left margin at the next vertical tab stop.

---

## ESC J or VTS

### Vertical tab setting.

ASCII Code	ESC J or VTS
Hexadecimal Value	1B 4A (7-bit) or 8A (8-bit)
Decimal Value	27 74 (7-bit) or 138 (8-bit)

This command causes a vertical tab stop to be set to the decipoint value of the current vertical position.

---

## ESC [ p<sub>1</sub>; p<sub>n</sub> v

### Sets vertical tab stops at specified positions (Multiple Vertical Tab Set - VTS).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> v
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 76
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 118

This command sets up to 12 vertical tab stops at each decipoint position specified by p parameters. The tab stops are measured from the top of the page. When specifying more than one position, enter the parameters in ascending order.

---

## FF

### Form feed.

ASCII Code	FF
Hexadecimal Value	0C
Decimal Value	12

This code causes the data in the print buffer to be printed out and then advances the paper to the top of the next form.

## ESC [ p<sub>1</sub>; p<sub>2</sub>; p<sub>3</sub> r

### Form definition (FD).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> ; p <sub>3</sub> r
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 3B p <sub>3</sub> 72
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 59 p <sub>3</sub> 114

This command sets the page length, top and bottom margins.

The p<sub>1</sub>, p<sub>2</sub> and p<sub>3</sub> parameters specify the decipoint values.

p <sub>n</sub>	FUNCTION
p <sub>1</sub>	Page Length
p <sub>2</sub>	Top Margin Position From the Beginning of the Page
p <sub>3</sub>	Bottom Margin Position From the End of the Page

The maximum page length value is 15840 decipoints (22 inches).

## ESC [ p<sub>1</sub>; p<sub>2</sub> <SP> G

### Sets the line/character spacing.

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> <SP> G
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 20 47
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 32 71

This command sets the spacing between lines (p<sub>1</sub> parameter) and the horizontal character pitch (p<sub>2</sub> parameter) in decipoints.

If the vertical spacing value exceeds the current form length, this setting will be ignored.

## Interface Control

---

### NUL

**Ignored.**

ASCII Code	NUL
Hexadecimal Value	NUL
Decimal Value	00

This code is ignored.

---

### DC1

**Selects printer (Data Control 1).**

ASCII Code	DC1
Hexadecimal Value	11
Decimal Value	17

In parallel interface, after the printer has been deselected by DC3 code, this code will select again the printer. In serial interface, this code is sent from the printer to the host to indicate that the printer is ready to receive data.

---

### DC3

**Deselects printer (Data Control 3).**

ASCII Code	DC3
Hexadecimal Value	13
Decimal Value	19

In parallel interface, this code causes the printer to enter the standby condition until a DC1 code is received. In serial interface, this code is sent from the printer to the host to indicate that it is not ready to receive data.

---

## Operating System Control

---

### BEL

#### Bell.

ASCII Code	BEL
Hexadecimal Value	07
Decimal Value	7

This code causes the buzzer to sound for about 0.5 second.

---

### DEL

#### Delete.

ASCII Code	DEL
Hexadecimal Value	7F
Decimal Value	127

In parallel interface, this code causes the last received character to be deleted.

---

### ESC

#### Escape.

ASCII Code	ESC
Hexadecimal Value	1B
Decimal Value	27

This code is used as an escape sequence introducer.



## ESC \ or ST

### String terminator.

ASCII Code	ESC \ or ST
Hexadecimal Value	1B 5C (7-bit) or 9C (8-bit)
Decimal Value	27 92 (7-bit) or 156 (8-bit)

This command closes the same escape sequences such as *dot graphics* commands.

## ESC Q or PU1

### Executes Selftest.

ASCII Code	ESC Q or PU1
Hexadecimal Value	1B 51 (7-bit) or 91 (8-bit)
Decimal Value	27 81 (7-bit) or 145 (8-bit)

In serial interface, upon receipt of this command the printer will transmit 1B 50 30 1B 5C.

## ESC c

### Resets to initial state (RIS).

ASCII Code	ESC c
Hexadecimal Value	1B 63
Decimal Value	27 99

This command will write into the current format the printer parameters from the stored format assigned to the current path.

## ESC k

**Prints test character (PTC).**

ASCII Code	ESC k
Hexadecimal Value	1B 6B
Decimal Value	27 107

This sequence causes one line of the print head test character to be printed.

## ESC [ p<sub>1</sub>...p<sub>n</sub> h

**Sets mode (SM).**

ASCII Code	ESC [ p <sub>1</sub> ...p <sub>n</sub> h
Hexadecimal Value	1B 5B p <sub>1</sub> 3B ...p <sub>n</sub> 68
Decimal Value	27 91 p <sub>1</sub> 59...p <sub>n</sub> 104

This command sets a specific print mode according to the parameter value. If the first parameter (p<sub>1</sub>) is preceded by a ">" symbol then all parameters will be interpreted as proprietary defined parameters. If the ">" character is not specified, all parameters will be interpreted as ANSI defined parameters.

The proprietary defined parameter values are:

p	MNEMONIC MODE	FUNCTION
1	PRM	Proportional Print Mode
3	CSI	Single Character CSI Mode
4	BLD	Bold Mode
5	CS2	Character Set 2 Mode

The ANSI defined parameter values are:

p	MNEMONIC MODE	FUNCTION
0		Ignored
20	LMN	Auto CR on LF

**ESC [ p<sub>1</sub>; p<sub>n</sub> I****Resets mode (RM).**

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> I
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 6C
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 108

This sequence resets the print mode(s) indicated by the p<sub>1</sub>/p<sub>n</sub> parameter(s).

**ESC [ p<sub>1</sub>; p<sub>2</sub> SP~****Selects emulation (EMU).**

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>2</sub> SP~
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>2</sub> 20 7E
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>2</sub> 32 126

This sequence selects the emulation according to p values. Parameter p<sub>1</sub> is an emulation identifier value while p<sub>2</sub> is a reset control value.

p <sub>1</sub>	p <sub>2</sub>	FUNCTION
0		ANSI
1 - 20		Reserved
21		IBM Proprinter XL 24/24E
22		EPSON LQ
	0	Hold values (default). The current settings remain valid after changing the printer emulation.
	1	Full reset. The status of such parameters reverts to defaults dependent on the selected emulation.

To select ANSI mode from the Proprinter XL 24 mode and maintaining the parameters, the sequence would be: <ESC>[0; 0<SP>~Leading zeros and defaulting parameters are not guaranteed to be parsed and therefore should not be used by the application. Parameter p<sub>1</sub> & p<sub>2</sub> will be expressed as ASCII, not binary, values. In the example above, "0" is "30H, not "00H".

## Paper Path Selection

### ESC [ p<sub>1</sub>; p<sub>n</sub> p

Assign source for forms.

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> p
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 70
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 112

This command controls the modes of paths for parking, loading paper. The p parameter is an ASCII value.

See the following table:

p	PAPER PATH CONTROL
0-7	Reserved
8	Park paper in the current path. Fanfold can be moved backwards for two form lengths. This creates a "Paper Out" fault condition that exists until paper is loaded from the control panel.
9	Load paper from the selected paper path.
10	Select and load paper from the Front2 (if the optional Front2 Push tractor assembly is installed). The current paper will be parked or ejected.
11	Select and load paper from the Front1. The current paper will be parked.
13	Select and load paper from the Front2 (if the optional Front2 Push tractor assembly is installed). The current paper will be parked or ejected.
14	Reserved.

---

## Graphics Control Functions

### ESC [ p<sub>1</sub> q

Select **graphics mode/density (GRM)**.

ASCII Code	ESC [ p <sub>1</sub> q
Hexadecimal Value	1B 5B p <sub>1</sub> 71
Decimal Value	27 91 p <sub>1</sub> 113

This command selects the density of the graphics mode.

p <sub>1</sub>	DPI (Horizontal)		Image	dpi vertical	#bytes/dot-column
	AGM=N	AGM=Y			
0	72	60	real	72	1 (6-bit mode)
1	144	120	real	72	1 " "
3	216	180	real	72	1 " "
10	180	180	real	180	4 (24-bit mode)
11	360	360	virtual	180	4 " "

## ESC P data

### Enter dot graphics mode (Device Control String).

ASCII Code	ESC P data
Hexadecimal Value	1B 50 data
Decimal Value	27 80

This command causes the dot graphics mode to be enabled. The density is selected according to the GRM command.

The line spacing value automatically changes if 72-dpi resolution (6-bit mode) is active.

The line spacing value for 180-dpi resolution (24-bit mode) must be selected prior to entering graphics mode.

In 6-bit mode, only 6 bits of a data byte are required to determine which wires are fired. Therefore, only one byte is required for each graphics dot column.

In 24-bit mode, 24 bits of four data bytes are required to determine which wires are fired. Only 6 bits of each byte are used. Therefore four bytes are required for each graphics dot column.

#### *6-bit mapping*

6 BITS IN 1 BYTE				
PRINT HEAD WIRE				DATA BIT
1	2	&	3	0
3	4	&	5	1
6	7	&	8	2
8	9	&	10	3
11	12	&	13	4
13	14	&	15	5

**Since bits 6 & 7 are ignored, wires 16-24 are not used. The state (0 or 1) of bits 6 and 7 must be conditioned so as to make the entire byte fall within the range 20H through 7EH.**

*24-bit mapping*

24 BITS IN 1 BYTE		
BYTE	PRINT HEAD WIRE	DATA BIT
1	1	0
	2	1
	3	2
	4	3
	5	4
	6	5
2	7	0
	8	1
	9	2
	10	3
	11	4
	12	5
3	13	0
	14	1
	15	2
	16	3
	17	4
	18	5
4	19	0
	20	1
	21	2
	22	3
	23	4
	24	5

## Barcode Functions

### ESC [ p<sub>1</sub>; p<sub>n</sub> }

Sets bar code parameters (BC).

ASCII Code	ESC [ p <sub>1</sub> ; p <sub>n</sub> }
Hexadecimal Value	1B 5B p <sub>1</sub> 3B p <sub>n</sub> 7D
Decimal Value	27 91 p <sub>1</sub> 59 p <sub>n</sub> 125

This command allows selection of the bar code characteristics such as style height, symbol rotation and so on. The command ESC [3 t enables the bar code mode while ESC [0 t disables the mode.

**p<sub>1</sub>: Bar code style**

p <sub>1</sub>	FUNCTION
0	Interleaved 2 of 5
1	Bidirectional 2 of 5
2	Matrix 2 of 5
3	Industrial 2 of 5
4	Code 3 of 9 (default)
5	EAN-8
6	EAN-13
7	Code 11
9	Codabar (default start/stop = a/t)
10	Codabar (default start/stop = b/n)
11	Codabar (default start/stop = c/*)
12	Codabar (default start/stop = d/e)
13	UPC-A
14	UPC-E
15	Code 93



<b>p<sub>1</sub></b>	<b>FUNCTION</b>
16	Code 128 (subset A, B and C)
17	Code 128 (subset A, B and C)
18	Code 128 (subset A, B and C)
19	MSI
20	UPC 2 Supplemental
21	UPC 5 Supplemental
22	EAN 2 Supplemental
23	EAN 5 Supplemental
50	Postnet

**p<sub>2</sub>: Barcode Height**

<b>p<sub>2</sub></b>	<b>FUNCTION</b>
1	Minimum bar code height (1/12 inch)
120	Maximum bar code height (10 inches)
12	Default bar code height (1 inch)

**p<sub>3</sub>: Human Readable Input (HRI)**

<b>p<sub>3</sub></b>	<b>FUNCTION</b>
0	Disables printing of the HRI
1	Enables printing of the HRI (default)

**p<sub>4</sub>: Narrow Bar**

Default width value: 2 (120, 144 and 180 dpi)

**p<sub>5</sub>: Wide Bar Width**

Default width value: 3 (120, 144 dpi), 4 (180 dpi)

**p<sub>6</sub>: Narrow Space Width**

Default width value: 6 (120, 144 and 180 dpi)

**p7: Wide Space Width**

Default width value: 7 (120, 144 dpi), 8 (180 dpi)

**p8: Intercharacter Space Width**

Default width value: 3 (120, 144 dpi), 4 (180 dpi)

**p9: Rotation**

<b>p9</b>	<b>FUNCTION</b>
0	0 degrees using current font
1	0 degrees using special HRI font
2	90 degrees using special HRI font
3	180 degrees using special HRI font
4	270 degrees using special HRI font

**p10: Horizontal Print Density for Bar Codes Printed**

<b>p10</b>	<b>FUNCTION</b>
1	120 dpi horizontal density
2	144 dpi horizontal density (Reserved)
3	180 dpi horizontal density

**p11: Check Digit**

<b>p11</b>	<b>FUNCTION</b>
0	No check digit requested (default)
1	Check digit requested

**p12: Human Readable Font - Reserved****p13: Bar Code Height (in 1/24th-inch increments) - Reserved**

## Basic Program Sample

```

100 DEFSTR E:RSC=CHR$(27) 'Define Escape character
110 WIDTH "LPT1:",255
120 LPRINT "FOLLOWING ARE SOME OF THIS PRINTER'S ";
121 LPRINT "FEATURES USING THE ANSI EMULATION"
130 LPRINT ESC;"[;72 G";"10 CPI (PICA)"
140 LPRINT ESC;"[;60 G";"12 CPI (ELITE)"
150 LPRINT ESC;"[;48 G";"15 CPI"
160 LPRINT ESC;"[;72 G";"10 CPI"
170 LPRINT
180 LPRINT ESC;"[6m";"PROPORTIONAL MODE"
190 LPRINT ESC;"[0m";"BACK TO NORMAL"
200 LPRINT
210 LPRINT ESC;"[5m";"DOUBLE-WIDE MODE"
220 LPRINT ESC;"[0m";"BACK TO NORMAL"
230 LPRINT
240 LPRINT ESC;"[1m";"BOLD PRINTING"
250 LPRINT ESC;"[0m";"BACK TO NORMAL"
260 LPRINT ESC;"[1m";"BOLD PRINTING"
270 LPRINT ESC;"[0m";"BACK TO NORMAL"
280 LPRINT
290 LPRINT ESC;"L";"PARTIAL LINE UP ";
300 LPRINT ESC;"K";"/ ";
310 LPRINT ESC;"K";"PARTIAL LINE DOWN ";
320 LPRINT ESC;"L";"BACK TO NORMAL"
330 LPRINT
340 LPRINT ESC;"[4m";"UNDERLINE MODE"
350 LPRINT ESC;"[0m";"BACK TO NORMAL"
360 LPRINT
370 LPRINT "          1          2          3";
371 LPRINT "          4          5          6"
380 LPRINT "1234567890123456789012345678901234567890";
381 LPRINT "12345678901234567890"
390 LPRINT
400 LPRINT ESC;"[10m";"DRAFT PRINT MODE"
410 REM
420 LPRINT ESC;"[720;2880a";
430 REM
440 LPRINT "LEFT MARGIN NOW BEGINS AT 1 INCH AND ";
441 LPRINT "RIGHT MARGIN NOW ENDS AT 4 INCHES"
450 LPRINT ESC;"[0;9792s"
460 REM
470 LPRINT "LEFT MARGIN NOW BEGINS AT 0 INCH AND ";
471 LPRINT "RIGHT MARGIN NOW ENDS AT 13.6 INCHES"
480 LPRINT
490 LPRINT ESC;"[62m";"LQ PRINT MODE (62mm x 125mm)"
500 LPRINT
510 LPRINT ESC;"[120; G";
520 FOR I=1 TO 3
530 LPRINT "1/6 INCH LINE FEED"
540 NEXT I
550 LPRINT
560 LPRINT ESC;"[90; G";
570 FOR J=1 TO 3
580 LPRINT "1/8 INCH LINE FEED"
590 NEXT J
600 LPRINT ESC;"[120; G";"NOW 1/6 INCH LINE FEED"
610 LPRINT "A FORMFEED <FF> FOLLOWS THIS LINE";CHR$(12)
620 END

```

## Basic Program Printed Output

```
FOLLOWING ARE SOME OF THIS PRINTER'S FEATURES USING THE ANSI EMULATION
10 CPI (PICA)
12 CPI (ELITE)
15 CPI
10 CPI

PROPORTIONAL MODE
BACK TO NORMAL

DOUBLE-WIDE MODE
BACK TO NORMAL

BOLD PRINTING
BACK TO NORMAL
BOLD PRINTING
BACK TO NORMAL

PARTIAL LINE UP / PARTIAL LINE DOWN BACK TO NORMAL

UNDERLINE MODE
BACK TO NORMAL

      1      2      3      4      5      6
123456789012345678901234567890123456789012345678901234567890

DRAFT PRINT MODE
      LEFT MARGIN NOW BEGINS AT 1 IN
      CH AND RIGHT MARGIN NOW ENDS A
      T 4 INCHES

LEFT MARGIN NOW BEGINS AT 0 INCH AND RIGHT MARGIN NOW ENDS AT 13.6 INCHES

LQ PRINT MODE

1/6 INCH LINE FEED
1/6 INCH LINE FEED
1/6 INCH LINE FEED

1/8 INCH LINE FEED
1/8 INCH LINE FEED
1/8 INCH LINE FEED
NOW 1/6 INCH LINE FEED
A FORMFEED <FF> FOLLOWS THIS LINE
```

## Tables

This section contains the character sets and the hexadecimal to decimal conversion table.

### Character Sets

#### Character Set 1

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	0	@	P	'	p	NUL		á	ı	À	Đ	a	=
01		DC1	!	1	A	Q	a	q		DC1	í	ı	Á	Ñ	ß	±
02		DC2	“	2	B	R	b	r		DC2	ó	ı	Â	Ò	G	=
03		DC3	#	3	C	S	c	s		DC3	ú	ª	Ã	Ó	P	=
04		DC4	\$	4	D	T	d	t		DC4	ñ	´	Ä	Ô	S	(
05			%	5	E	U	e	u			Ñ	µ	Å	Õ	s	)
06			&	6	F	V	f	v			ª	¶	Æ	Ö	µ	÷
07	BEL		'	7	G	W	g	w	BEL		º	·	Ç	×	t	~
08	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	,	È	Ø	F	°
09	HT		)	9	I	Y	i	y	HT		¬	¹	É	Ù	T	·
0A	LF		*	:	J	Z	j	z	LF		¬	º	Ê	Ú	O	·
0B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	»	Ë	ı	d	v
0C	FF		,	<	L	\	l		FF		¼	¼	Ì	—	8	n
0D	CR		-	=	M	]	m	}	CR		ı	½	Í	ı	f	²
0E	SO		.	>	N	^	n	~	SO		«	¾	Î	ı	e	ı
0F	SI		/	?	O	_	o	DEL	SI		»	¿	Ï	—	n	SP

## Character Set 2

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	0	@	P	'	p	Ç	É	á	ı	À	Đ	a	=
01		DC1	!	1	A	Q	a	q	ü	æ	í	ı	Á	Ñ	ß	±
02	`	DC2	“	2	B	R	b	r	é	Æ	ó	ı	Â	Ò	G	=
03	♥	DC3	#	3	C	S	c	s	â	ô	ú	ª	Ã	Ó	p	=
04	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	´	Ä	Ö	S	(
05	♣	§	%	5	E	U	e	u	à	ò	Ñ	μ	Å	Õ	s	)
06	♠		&	6	F	V	f	v	å	û	ª	¶	Æ	Ö	μ	÷
07	BEL		‘	7	G	W	g	w	ç	ù	º	·	Ç	×	t	~
08	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	,	È	Ø	F	°
09	HT		)	9	I	Y	i	y	ë	ö	¬	¹	É	Ù	T	·
0A	LF		*	:	J	Z	j	z	è	Û	¬	º	Ê	Ú	O	·
0B	VT	ESC	+	;	K	[	k	{	ï	ç	½	»	Ë	ı	d	v
0C	FF		,	<	L	\	l		î	£	¼	¼	Ì	_	8	n
0D	CR		-	=	M	]	m	}	ì	¥	ı	½	Í	ı	f	²
0E	SO		.	>	N	^	n	~	Ä	Ɛ	«	¾	Î	ı	e	ı
0F	SI		/	?	O	_	o	DEL	Å	f	»	¿	Ï	—	n	SP

## ANSI Emulation

### Character Set 1 Enabled (8 Bit Control Disabled)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	x	x	x	x	x			x	x	x	x	x	x
01		DC1	x	x	x	x	x	x		DC1	x	x	x	x	x	x
02			x	x	x	x	x	x			x	x	x	x	x	x
03	ETX	DC3	x	x	x	x	x	x		DC3	x	x	x	x	x	x
04			x	x	x	x	x	x			x	x	x	x	x	x
05	ENQ		x	x	x	x	x	x			x	x	x	x	x	x
06	ACK		x	x	x	x	x	x			x	x	x	x	x	x
07	BEL		x	x	x	x	x	x	BEL		x	x	x	x	x	x
08	BS		x	x	x	x	x	x	BS		x	x	x	x	x	x
09	HT		x	x	x	x	x	x	HT		x	x	x	x	x	x
0A	LF		x	x	x	x	x	x	LF		x	x	x	x	x	x
0B	VT	ESC	x	x	x	x	x	x	VT	ESC	x	x	x	x	x	x
0C	FF		x	x	x	x	x	x	FF		x	x	x	x	x	x
0D	CR		x	x	x	x	x	x	CR		x	x	x	x	x	x
0E	SO		x	x	x	x	x	x	SO		x	x	x	x	x	x
0F	SI		x	x	x	x	x	DEL	SI		x	x	x	x	x	

## Character Set 1 Enabled (8 Bit Control Enabled)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	x	x	x	x	x		DCS	x	x	x	x	x	x
01		DC1	x	x	x	x	x	x		PU1	x	x	x	x	x	x
02			x	x	x	x	x	x			x	x	x	x	x	x
03	ETX	DC3	x	x	x	x	x	x			x	x	x	x	x	x
04			x	x	x	x	x	x	IND		x	x	x	x	x	x
05	ENQ	x	x	x	x	x	x	x	NEL		x	x	x	x	x	x
06	ACK		x	x	x	x	x	x			x	x	x	x	x	x
07	BEL		x	x	x	x	x	x			x	x	x	x	x	x
08	BS		x	x	x	x	x	x	HTS		x	x	x	x	x	x
09	HT		x	x	x	x	x	x			x	x	x	x	x	x
0A	LF		x	x	x	x	x	x	VTS		x	x	x	x	x	x
0B	VT	ESC	x	x	x	x	x	x	PLD	CSI	x	x	x	x	x	x
0C	FF		x	x	x	x	x	x	PLU	ST	x	x	x	x	x	x
0D	CR		x	x	x	x	x	x	RI		x	x	x	x	x	x
0E	SO		x	x	x	x	x	x			x	x	x	x	x	x
0F	SI		x	x	x	x	x	DEL			x	x	x	x	x	



## Character Set 2 Enabled

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	x	x	x	x	x	x	x	x	x	x	x	x	x
01		DC1	x	x	x	x	x	x	x	x	x	x	x	x	x	x
02			x	x	x	x	x	x	x	x	x	x	x	x	x	x
03	ETX	DC3	x	x	x	x	x	x	x	x	x	x	x	x	x	x
04			x	x	x	x	x	x	x	x	x	x	x	x	x	x
05	ENQ	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
06	ACK		x	x	x	x	x	x	x	x	x	x	x	x	x	x
07	BEL		x	x	x	x	x	x	x	x	x	x	x	x	x	x
08	BS		x	x	x	x	x	x	x	x	x	x	x	x	x	x
09	HT		x	x	x	x	x	x	x	x	x	x	x	x	x	x
0A	LF		x	x	x	x	x	x	x	x	x	x	x	x	x	x
0B	VT	ESC	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0C	FF		x	x	x	x	x	x	x	x	x	x	x	x	x	x
0D	CR		x	x	x	x	x	x	x	x	x	x	x	x	x	x
0E	SO		x	x	x	x	x	x	x	x	x	x	x	x	x	x
0F	SI		x	x	x	x	x	DEL	x	x	x	x	x	x	x	

## EPSON National Variations

	35	36	64	91	92	93	94	96	123	124	125	126	(dec.)
<b>USA</b>	#	\$	@	[	\	]	^	`	{		}	~	
<b>FRANCE</b>			À	°	Ç	È			É	Ù	Ê	¨	
<b>GERMANY</b>			Š	Ä	Ö	Ü			Ẃ	Ö	Ü	ß	
<b>UNITED KINGDOM</b>	£												
<b>DENMARK-1</b>				Æ	Ø	Å			æ	ø	å		
<b>SWEDEN</b>	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü		
<b>ITALY</b>			°						ù	à	ò	é	ì
<b>SPAIN-1</b>	₧			í	ñ	¿			¨	ñ			
<b>JAPAN</b>				¥								˘	
<b>NORWAY</b>	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü		
<b>DENMARK-2</b>				Æ	Ø	Å	Ü	é	æ	ø	å	ü	
<b>SPAIN-2</b>				À	Í	Ñ	¿		Í	Ñ	Ó	Ú	
<b>LATIN AMERICA</b>				À	Í	Ñ	¿		Í	Ñ	Ó	Ú	
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E	(hex.)

## ANSI National Variations

	33	35	36	38	39	42	59	64	91	92	93	94	96	113	123	124	125	126	(dec.)
USA	!	#	\$	&	'	*	;	@	[	\	]	^	`	q	{		}	~	
German	!	#	\$	&	'	*	;	5	Ä	Ö	U	^	`	q	ä	ö	ü	ß	
French A	!	£	\$	&	'	*	;	à	°	ç	5	^	`	q	é	ù	è	..	
French B	!	é	à	î	'	è	;	è	à	\	ù	û	ç	q	{		}	ó	
French/Canadian	!	#	\$	&	'	*	;	À	Á	Ç	É	Í	Ò	Q	É	Ù	È	À	
Netherlands	!	#	ƒ	&	'	*	;	@	[	\	]	^	`	q	^		ij	..	
Italian	!	£	\$	&	'	*	;	5	°	ç	é	^	`	q	À	ó	è	í	
United Kingdom	!	£	\$	&	'	*	;	@	[	\	]	^	`	q	{		}	~	
Spanish	!	£	\$	&	'	*	;	@	;	ñ	¿	^	`	q	..	ñ	}	~	
Danish/Norwegian A	!	#	§	&	'	*	;	@	Æ	Ø	Å	^	`	q	æ	ø	å	~	
Danish/Norwegian B	!	#	□	&	'	*	;	@	Æ	Ø	Å	^	`	q	æ	ø	å	~	
Danish/Norwegian C	!	#	§	&	'	*	;	Æ	Ø	Å	U	é	q	æ	ø	å	ü		
Danish/Norwegian D	!	#	□	&	'	*	;	Æ	Ø	Å	U	é	q	æ	ø	å	ü		
Swedish/Finnish A	!	#	§	&	'	*	;	@	Å	Ö	Å	^	`	q	ä	ö	å	~	
Swedish/Finnish B	!	#	□	&	'	*	;	@	Å	Ö	Å	^	`	q	ä	ö	å	~	
Swedish/Finnish C	!	#	§	&	'	*	;	Æ	Ö	Å	U	é	q	ä	ö	å	ü		
Swedish/Finnish D	!	#	□	&	'	*	;	Æ	Ö	Å	U	é	q	ä	ö	å	ü		
Switzerland	!	#	\$	&	'	*	;	ç	à	é	è	^	`	q	ä	ö	ü	~	
USA (ISO)	!	#	\$	&	'	*	;	@	[	\	]	^	`	q	{		}	~	
Yugoslavia	!	#	§	&	'	*	;	Ž	Š	Đ	Č	Š	q	š	đ	č	ć		
United Kingdom A	!	\$	£	&	'	*	;	@	[	\	]	^	`	q	{		}	~	
Turkey	!	£	\$	&	'	*	;	Ç	Ş	İ	Ö	U	ç	Ş	ı	ö	ü		
Greece	Γ	Δ	Σ	Θ	Α	*	Σ	π	Σ	Φ	Ψ	Ω	`	q	{		}	~	
Cyrillic	!	#	§	&	'	*	;	@	[	\	]	^	`	q	{		}	~	
	21	23	24	26	27	2A	3B	40	5B	5C	5D	5E	6D	71	7B	7C	7D	7E	(hex.)

## IBM National Variations

### USA (CP 437)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	Ø	▸		0	@	P	'	p	Ç	É	á	█	L	↓	œ	=
01	ð	◄	!	1	A	Q	a	q	ū	æ	í	▬	↓	T	£	±
02	À	·	"	2	B	R	b	r	é	Æ	ó	█	T	T	Γ	≈
03	♥	!!	#	3	C	S	c	s	â	ô	ú		↓	L	π	≤
04	♦	¶	\$	4	D	T	d	t	ã	ö	ñ	↓	-	L	Σ	∫
05	♣	§	%	5	E	U	e	u	à	ò	Ñ	↓	+	r	Ω	∫
06	♠	-	&	6	F	V	f	v	ã	û	ª	↓	↓	r	μ	÷
07	•	ˆ	‘	7	G	W	g	w	ç	ù	º	↓	↓	†	τ	≈
08	-	↑	(	8	H	X	h	x	ê	ÿ	¿	↓	L	†	Φ	°
09	°	↓	)	9	I	Y	i	y	ë	ö	¬	↓	r	↓	§	•
0A	■	→	*	:	J	Z	j	z	è	Û	¬	↓	↓	r	Ω	•
0B	♂	←	+	;	K	[	k	[	ï	ç	¼	↓	T	█	ð	√
0C	♀	L	,	<	L	\	l		î	£	½	↓	↓	█	=	²
0D	♪	™	-	=	M	]	m	}	ï	¥	ı	↓	-	↓	φ	˙
0E	♫	σ	.	>	N	^	n	~	Ä	ß	<	↓	↓	↓	ε	■
0F	Ψ	τ	/	?	O	_	o	⌢	Å	f	>	↓	↓	█	Π	

## Greek (CP 437-G)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	Ø	►		0	@	P	'	p	Α	Ρ	ι	⋮	⊥	⊥	ω	ο
01	ϑ	◄	!	1	Α	Q	a	q	Β	Σ	κ	⋮	⊥	⊥	α	±
02	Λ	·	“	2	B	R	b	r	Γ	Τ	λ	■	⊥	⊥	ε	≥
03	♥	!!	#	3	C	S	c	s	Δ	Υ	μ		⊥	⊥	η	≤
04	♦	¶	\$	4	D	T	d	t	E	Φ	ν	⊥	—	⊥	,	
05	♣	§	%	5	E	U	e	u	Z	X	ξ	⊥	⊥	⊥	,	
06	♠	—	&	6	F	V	f	v	H	Ψ	ο	⊥	⊥	⊥	ο	÷
07	•	⋮	‘	7	G	W	g	w	Θ	Ω	π	⊥	⊥	⊥	η	≈
08	—	↑	⟨	8	H	X	h	x	Ι	α	ρ	⊥	⊥	⊥	η	ο
09	°	↓	)	9	I	Y	i	y	K	β	σ	⊥	⊥	⊥	ω	£
0A	■	→	*	:	J	Z	j	z	Λ	γ	ς		⊥	⊥	Α	Υ
0B	♂	←	+	;	K		k		Μ	δ	τ	⊥	⊥	■	Ε	✓
0C	♀	⊥	,	<	L	\	l		N	ε	υ	⊥	⊥	■	Η	α
0D	♪	≈	-	=	M		m		Ξ	ξ	♥	⊥	—	⊥	Ι	’
0E	♫	σ	.	>	N	^	n	~	O	η	χ	⊥	⊥	⊥	Ο	■
0F	Ψ	τ	/	?	O	—	ο	⏞	Π	θ	ψ	⊥	⊥	■	Υ	

## Croatian (CP 437-SLAVIC)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	Ž	P	ž	p	Ç	É	á	⌘	Ł	⌚	α	≡
1	!	1	A	Q	a	q	Ù	æ	í	⌘	⌚	⌚	β	±
2	"	2	B	R	b	r	é	Æ	ó	⌘	⌚	⌚	Γ	≥
3	#	3	C	S	c	s	à	ò	ú			⌚	π	≤
4	\$	4	D	T	d	t	ä	ö	ñ		—	⌚	Σ	∫
5	%	5	E	U	e	u	à	ò	Ñ	÷	+	⌚	σ	∫
6	&	6	F	V	f	v	à	û	æ	⌘	⌚	⌚	μ	÷
7	'	7	G	W	g	w	Ç	ù	ó	⌚	⌚	⌚	τ	≈
8	(	8	H	X	h	x	é	ý	¿	⌚	⌚	⌚	Φ	°
9	)	9	I	Y	i	y	ë	ö	⌚	⌚	⌚	⌚	Θ	•
A	*	:	J	Z	j	z	è	Ü	⌚	⌚	⌚	⌚	Ω	•
B	+	;	K	Š	k	š	ÿ	ø	½	⌚	⌚	■	δ	√
C	,	<	L	Đ	l	đ	í	£	¼	⌚	⌚	■	∞	ⁿ
D	—	=	M	Ć	m	ć	ı	¥	ı	⌚	=	■	∅	²
E	.	>	N	Č	n	č	Ä	℞	«	÷	⌚	■	ε	▪
F	/	?	O	—	o		À	ƒ	»	⌚	⌚	■	∩	

## Multilingual (CP 850)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	Ø	►		0	@	P	'	p	Ç	É	á	☐	Ł	ð	Ó	-
01	ð	◄	!	1	A	Q	a	q	ü	æ	í	☐	⊥	Đ	ß	±
02	Λ	.	"	2	B	R	b	r	é	Æ	ó	☐	Τ	Ê	Ô	_
03	♥	!!	#	3	C	S	c	s	â	ô	ú		†	Ê	Ô	¼
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	†	-	È	ö	¶
05	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	†	ı	Ô	§
06	♠	-	&	6	F	V	f	v	ã	û	ä	Â	á	í	μ	÷
07	•	ˆ	'	7	G	W	g	w	ç	ù	°	À	À	İ	þ	ˆ
08	-	↑	(	8	H	X	h	x	ê	ÿ	¿	©	Ł	İ	þ	°
09	°	↓	)	9	I	Y	i	y	ë	Ö	©	↓	ŕ	Ĵ	Ú	ˆ
0A	■	→	*	:	J	Z	j	z	è	Û	¬		⊥	ŕ	Û	.
0B	♂	←	+	;	K	[	k	[	ı	ø	½	¶	Τ	☐	Û	ı
0C	♀	⌞	,	<	L	\	l		ı	£	¼	↓	†	■	ý	ˆ
0D	♪	≡	-	=	M	]	m	]ı	ı	Ø	ı	¢	-	ı	Ý	ˆ
0E	♫	σ	.	>	N	^	n	~	Ä	×	«	¥	†	ı	-	■
0F	Ψ	τ	/	?	O	_	o	☐	Ä	f	»	¶	☐	☐	'	

## Greek (CP 851)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		ı	@	P	'	p	Ç	I	ı	☐	L	⊥	ω	o
01	ð	◄	!	1	A	Q	a	q	ü		ı	☐	⊥	⊥	α	±
02	Λ	·	“	2	B	R	b	r	Γ	Τ	ó	■	⊥	⊥	ε	≥
03	♥	!!	#	3	C	S	c	s	Δ	Υ	ú		⊥	⊥	η	≤
04	♦	¶	\$	4	D	T	d	t	E	φ	ñ	⊥	—	⊥	ı	
05	♣	§	%	5	E	U	e	u	Z	X	Ñ	⊥	+	⊥	ı	
06	♠	—	&	6	F	V	f	v	H	Ψ	o	⊥	⊥	⊥	ø	÷
07	•	˙	‘	7	G	W	g	w	Θ	Ω	π	⊥	⊥	⊥	π	≈
08	—	↑	⟨	8	H	X	h	x	I	α	ρ	⊥	⊥	⊥	π	°
09	°	↓	)	9	I	Y	i	y	K	β	σ	⊥	⊥	⊥	ω	£
0A	■	→	*	:	J	Z	j	z	Λ	γ	ζ		⊥	⊥	⊥	Υ
0B	♂	←	+	;	K	[	k	{	M	δ	τ	⊥	⊥	■	E	√
0C	♀	L	,	<	L	\	l		N	ε	υ	⊥	⊥	■	H	π
0D	♫	≈	-	=	M	]	m	}	Ξ	ξ	▼	⊥	—	⊥	I	'
0E	♩	σ	.	>	N	^	n	~	O	η	χ	⊥	⊥	⊥	O	■
0F	Ψ	τ	/	?	O	_	o	☐	Π	θ	ψ	⊥	⊥	■	γ	



## Eastern Europe (CP 852)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	á	Ł	ł	ó	-	
01	®	◄	!	1	À	Q	a	q	ü	Í	í	Ł	ł	ø	ß	“
02	®	†	"	2	B	R	b	r	é	í	ó	Ł	ł	Đ	Đ	.
03	♥	!!	#	3	C	S	c	s	ä	ö	ú			È	Ñ	~
04	♦	¶	\$	4	D	T	d	t	ä	ö	À		-	ä	n	~
05	♦	§	%	5	E	U	e	u	ü	Ł	ą	Á	†	Ń	ń	š
06	♦	_	&	6	F	V	f	v	é	Í	Ž	À	À	í	Š	÷
07	•	‡	'	7	G	W	g	w	ç	Š	ž	È	ä	İ	ı	,
08	□	†	(	8	H	X	h	x	ı	š	ž	Ł	ł	é	Ř	°
09	◊	‡	)	9	I	Y	i	y	ë	Ö	ę	Ł	ł	Ú	ú	..
0A	■	→	*	:	J	Z	j	z	Ö	Ü		Ł	ł	ŕ	ř	.
0B	♂	←	+	;	K	[	k	{	ö	ť	ž	Ł	ł	Ů	ů	
0C	♀	⊥	,	<	L	\	l		ı	č	č	Ł	ł	Ź	ř	Ř
0D	♪	↔	-	=	M	]	m	}	Ž	Ł	š	Ž	=	Ť	Ý	ř
0E	♂	▲	.	>	N	^	n	~	Ä	×	«	ž	Ł	Ů	ť	■
0F	✱	▼	/	?	O	_	o	◊	Č	č	»		ı	■	'	

## Turkish (CP 853)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	á	⋮	Ł		ó	-
01	©	◄	!	1	À	Q	a	q	ü	è	í	⋮	⊥		ß	
02	•	†	"	2	B	R	b	r	é	Ç	ó	⋮	Ť	Ê	Ô	ı
03	♥	!!	#	3	C	S	c	s	â	ô	ú		†	Ë	Ò	h
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	†	-	È	Ğ	˘
05	♣	\$	%	5	E	U	e	u	à	ò	Ñ	Á	†	ı	ğ	Ş
06	♣	-	&	6	F	V	f	v	ê	û	Č	Â	Š	í	µ	÷
07	•	‡	'	7	G	W	g	w	ç	ù	ğ	À	š	İ	Œ	,
08	□	†	(	8	H	X	h	x	ê	î	Œ	Ş	Ł	ï	h	°
09	◊	ı	)	9	I	Y	i	y	ë	Ö	ñ	⋮	Ť	ı	Ú	˙
0A	■	→	*	:	J	Z	j	z	è	Ü		⋮	⊥	Ť	0	.
0B	♂	←	+	;	K	[	k	{	ï	ğ	½	Ť	Ť	■	Ù	
0C	♀	⊥	,	<	L	\	l		î	£	Ţ	Ţ	⋮	■	Û	³
0D	›	↔	-	=	M	]	m	}	ı	Ğ	ş	Ž	=		ü	²
0E	♂	▲	.	>	N	^	n	~	Ä	×	«	ž	⋮	†		■
0F	*	▼	/	?	O	_	o	◊	Č	ý	»	Ť	■	■		'

## Cyrillic (CP 855)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
01	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
02	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
03	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
04	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
05	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
06	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
07	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
08	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
09	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0A	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0B	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0C	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0D	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0E	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0F	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

## Turkish (CP 857)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	á	⋮	Ł	ø	Ó	-
01	©	◄	!	1	Å	Q	a	q	ü	æ	í	⋮	Ł	ä	ß	±
02	•	†	"	2	B	R	b	r	é	Æ	ó	⋮	Ţ	Ê	Ô	
03	♥	!!	#	3	C	S	c	s	â	ô	ú		Ţ	Ë	Ò	
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		-	È	ö	¶
05	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	†		Õ	§
06	♠	_	&	6	F	V	f	v	ä	ü	Ç	Å	ä	í	µ	÷
07	•	‡	'	7	G	W	g	w	ç	ù	ğ	À	Å	İ		,
08	□	†	(	8	H	X	h	x	ê	ï	ı	•	Ł	İ	×	•
09	◊	‡	)	9	I	Y	i	y	ë	Ö	•	Ţ	Ţ	Ţ	Ú	..
0A	■	→	*	:	J	Z	j	z	è	Ü	¬		Å	Ţ	Ţ	.
0B	♂	←	+	;	K	[	k	{	ï	ø	¼	Ţ	Ţ	■	Ù	¹
0C	♀	⊥	,	<	L	\	l		î	£	¾	Ţ	Ţ	■	İ	³
0D	♂	↔	-	=	M	]	m	}	ı	ø	ı	•	=	ı	Ÿ	²
0E	♂	▲	.	>	N	^	n	~	Ä	Ş	«	¥	Ţ	İ	-	■
0F	※	▼	/	?	O	_	o	◊	Å	ş	»	Ţ	■	■	'	

## Euro PC Multilingual (CP 858)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P		p	Ç	É	á	▒	Ł	ø	Ó	-
1	!	1	A	Q	a	q	ü	æ	í	▒	Ł	Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó	▒	Ť	È	Ö	-
3	#	3	C	S	c	s	â	ô	ú		Ť	Ë	Ò	¾
4	\$	4	D	T	d	t	ä	ö	ñ		-	È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á	†	€	Õ	§
6	&	6	F	V	f	v	å	û	ä	Â	ã	í	μ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©	Ł	İ	Þ	°
9	)	9	I	Y	i	y	ë	ö	®	Ť	Ť	Ť	Ú	ˆ
A	*	:	J	Z	j	z	è	Ü	ˆ		Ł	Ť	Û	˙
B	+	;	K	[	k	{	ï	ø	½	Ť	Ť	▒	Ü	¹
C	,	<	L	\	l		í	£	¼	Ť	Ť	▒	Ý	º
D	-	=	M	]	m	}	ì	ø	ì	¢	=	:	Ý	²
E	.	>	N	ˆ	n	˜	Ä	×	«	¥	Ť	İ	-	³
F	/	?	O	_	o		Å	f	»	Ť	¤	▒		

## Portugal (CP 860)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	á	⋮	Ł	ł	α	≡
01	ø	◄	!	1	À	Q	a	q	ü	À	í	⋮	⊥	⌈	β	±
02	•	†	"	2	B	R	b	r	é	È	ó	⋮	⌈	⌈	Γ	¿
03	♥	!!	#	3	C	S	c	s	à	ò	ú		⌈	⌈	π	≤
04	♦	π	\$	4	D	T	d	t	ã	õ	ñ		—	Ł	Σ	ƒ
05	♣	\$	%	5	E	U	e	u	à	ò	Ñ		†	ƒ	σ	Ј
06	♣	—	&	6	F	V	f	v	Á	Ú	ä	⌈	⌈	π	μ	÷
07	•	†	'	7	G	W	g	w	ç	ù	ø	⌈	⌈	⌈	τ	≈
08	□	†	(	8	H	X	h	x	ê	î	¿	⌈	⌈	⌈	°	
09	◊	!	)	9	I	Y	i	y	Ê	Ô	Ò	⌈	⌈	⌈	θ	·
0A	■	→	*	:	J	Z	j	z	è	Ü	¬	⌈	⌈	⌈	Ω	·
0B	♂	←	+	;	K	[	k	{	í	ç	½	⌈	⌈	⌈	δ	√
0C	♀	⌈	,	<	L	\	l		Ô	£	¼	⌈	⌈	⌈	∞	n
0D	♪	↔	-	=	M	]	m	}	ì	Ù	ì	⌈	=	⌈	ø	²
0E	♂	▲	.	>	N	^	n	~	Ã	℔	«	⌈	⌈	⌈	ε	■
0F	※	▼	/	?	O	_	o	◊	Â	Ó	»	⌈	±	■	∩	

## Hebrew (CP 862)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	א	ב	ג	ד	ה	ו	ז	ח	ט	י	כ	ל	מ	נ	ס	ע
01	פ	צ	ק	ר	ש	ת	י	י	י	י	י	י	י	י	י	י
02	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
03	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
04	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
05	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
06	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
07	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
08	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
09	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0A	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0B	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0C	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0D	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0E	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י
0F	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י	י

## Canada/France (CP 863)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	:	⋮	Ł	ł	α	≡
01	©	◄	!	1	À	Q	a	q	ü	È	´	⋮	⊥	⌈	ß	±
02	•	†	"	2	B	R	b	r	é	Ê	ó	⋮	⌈	⌈	Γ	≥
03	♥	!!	#	3	C	S	c	s	à	ô	ú		⌈	⌈	π	≤
04	♦	¶	\$	4	D	T	d	t	Å	Ë	¨	⌈	-	⌈	Σ	Γ
05	♣	\$	%	5	E	U	e	u	à	Ï	,	⌈	⌈	⌈	σ	J
06	♣	-	&	6	F	V	f	v	¶	ü	³	⌈	⌈	⌈	μ	÷
07	•	i	'	7	G	W	g	w	ç	ù	˘	⌈	⌈	⌈	τ	≈
08	□	†	(	8	H	X	h	x	è	ı	ı	⌈	⌈	⌈	⊕	°
09	○	ı	)	9	I	Y	i	y	ë	Ô	˘	⌈	⌈	⌈	⊙	•
0A	■	→	*	:	J	Z	j	z	ê	Ü	˘	⌈	⌈	⌈	Ω	•
0B	♂	←	+	;	K	[	k	{	ï	ç	½	⌈	⌈	⌈	δ	√
0C	♀	⌈	,	<	L	\	l		ı	£	¼	⌈	⌈	⌈	∞	n
0D	♂	↔	-	=	M	]	m	}	=	Û	¾	⌈	=	⌈	ø	²
0E	♂	▲	.	>	N	˘	n	˘	À	Œ	«	⌈	⌈	⌈	ε	■
0F	✱	▼	/	?	O	_	o	△	S	ƒ	»	⌈	⌈	⌈	∩	



## Arabic (CP 864)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
01	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
02	W	X	Y	Z	[	\	]	^	_	`	a	b	c	d	e	f
03	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
04	w	x	y	z	{		}	~								
05	=	>	<	&	%	\$	#	@	!	"	#	\$	%	&	'	(
06	)	*	+	=	<	>	&	%	\$	#	@	!	"	#	\$	%
07	&	%	\$	#	@	!	"	#	\$	%	&	'	(	)	*	+
08	=	>	<	&	%	\$	#	@	!	"	#	\$	%	&	'	(
09	)	*	+	=	<	>	&	%	\$	#	@	!	"	#	\$	%
0A	&	%	\$	#	@	!	"	#	\$	%	&	'	(	)	*	+
0B	=	>	<	&	%	\$	#	@	!	"	#	\$	%	&	'	(
0C	)	*	+	=	<	>	&	%	\$	#	@	!	"	#	\$	%
0D	&	%	\$	#	@	!	"	#	\$	%	&	'	(	)	*	+
0E	=	>	<	&	%	\$	#	@	!	"	#	\$	%	&	'	(
0F	)	*	+	=	<	>	&	%	\$	#	@	!	"	#	\$	%

## CP 864E (Arabic)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	Ø	►		0	@	P	`	p	°	٫		•	¢	ذ	ـ	ـ
01	⊕	◄	!	1	A	Q	a	q	•	∞	—	١	٢	ر	ف	ـ
02	⊗	↑	"	2	B	R	b	r	•	•	٢	٣	٤	ز	ظ	ن
03	♥	!!	#	3	C	S	c	s	√	±	£	٣	٩	س	ك	هـ
04	♣	¶	\$	4	D	T	d	t	≡	½	¤	£	٩	ش	ل	ح
05	♣	§	%	5	E	U	e	u	≡	¾	ℓ	هـ	ع	ص	م	ي
06	♣	—	&	6	F	V	f	v	≡	≈	ل	٦	ث	ض	ن	ي
07	•	‡	'	7	G	W	g	w	∠	ئ	ل	٧	ا	ط	هـ	خ
08	■	†	(	8	H	X	h	x	∠	ئ	ل	٨	ب	ظ	و	ق
09	◊	‡	)	9	I	Y	i	y	∠	لا	ب	٩	ة	ع	ي	لا
0A	■	→	*	:	J	Z	j	z	∠	لا	ت	ف	ت	ع	ب	لا
0B	♂	←	+	;	K	[	k	{	∠	لا	ت	٤	ث	ا	ض	ل
0C	♀	⌊	,	<	L	\	l		∠	لا	،	س	ج	ر	ح	ك
0D	♂	⇒	—	=	M	]	m	}	∠	لا	ح	ش	ح	÷	غ	ي
0E	♂	▲	.	>	N	^	n	~	∠	لا	ح	ص	خ	x	غ	ق
0F	⊗	▼	/	?	O	_	o	□	∠	لا	خ	?	د	ع	م	

## Denmark/Norway (CP 865)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		o	@	P	`	p	ç	é	á	⋮	l	ll	α	≡
01	ø	◄	!	1	Å	Q	a	q	ü	æ	í	⋮	l	ȳ	β	±
02	ø	‡	"	2	B	R	b	r	é	Æ	ó	⋮	ȳ	ȳ	Γ	≥
03	♥	!!	#	3	C	S	c	s	ä	ö	ú		†	ll	π	≤
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		-	l	Σ	Γ
05	♦	\$	%	5	E	U	e	u	ä	ö	ñ		†	f	σ	J
06	♦	-	&	6	F	V	f	v	ä	ü	ä		†	¶	μ	÷
07	•	i	'	7	G	W	g	w	ç	ù	ø	¶			τ	≈
08	□	†	(	8	H	X	h	x	ë	ÿ	¿	¶	ll	†	ø	°
09	o	‡	)	9	I	Y	i	y	ë	Ö	~	¶	¶	J	ø	•
0A	■	→	*	:	J	Z	j	z	ë	Ü	~		ll	Γ	Ω	•
0B	♂	←	+	;	K	[	k	{	i	ø	½	¶	ȳ	■	ó	√
0C	♀	L	,	<	L	\	l	í	£	¼	¶		■	•	n	
0D	♪	↔	-	=	M	]	m	}	i	ø	i	¶	=		ø	²
0E	♂	▲	.	>	N	^	n	~	Ä	Æ	«	¶		■	ε	■
0F	*	▼	/	?	O	_	o	ó	Å	ƒ	¤	¶	±	■	∩	

## Russian (CP 866)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	0	▸		0	ё	Р	`	р	А	Р	а	⋮	І	и	р	Ё
01	©	◀	!	1	А	Q	а	q	Б	С	б	⋮	І	т	с	ё
02	•	†	"	2	В	Р	б	р	В	Т	в	⋮	Т	и	т	ё
03	♥	!!	#	3	С	С	с	с	Г	У	г		І	у	е	
04	♦	и	\$	4	Д	Т	д	т	Д	Ф	д		-	ё	ф	ї
05	♦	\$	%	5	Е	U	е	u	Е	X	е		†	р	х	і
06	♦	-	&	6	Ф	V	ф	в	Ж	Ц	ж	⋮	І	и	ц	у
07	•	і	'	7	Г	W	г	w	З	Ч	з	и	и	и	ч	у
08	□	†	(	8	Н	X	н	х	И	Ш	и	і	ё	†	и	°
09	○	†	)	9	І	Y	і	у	Й	Щ	й	и	и	и	щ	.
0A	■	→	*	:	J	Z	j	z	К	Ь	к	⋮	и	г	ь	.
0B	♂	←	+	;	К	[	к	{	Л	Ы	л	и	и	и	и	√
0C	♀	L	,	<	L	\	l		М	Ь	м	и	и	и	и	и
0D	♪	↔	-	=	М	]	и	}	Н	Э	и	и	=	и	э	и
0E	и	▲	.	>	N	^	n	~	О	Ю	о	и	и	и	и	и
0F	※	▼	/	?	О	_	о	о	П	Я	п	и	и	и	и	и

## Turkish 2 (CP 867)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p	Ç	É	á	⋮	Ł	ø	Ó	-
01	@	◄	!	1	À	Q	a	q	ü	æ	í	⋮	Ł	ä	ß	±
02	•	†	"	2	B	R	b	r	é	æ	ó	⋮	Ţ	Ê	Ô	
03	♥	!!	#	3	C	S	c	s	ä	ö	ú		Ł	È	Ò	×
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		-	È	ö	¶
05	♣	\$	%	5	E	U	e	u	ä	ö	Ñ	À	†		Ö	S
06	♣	-	&	6	F	V	f	v	ä	ü	Ğ	Â	ä	í	µ	÷
07	•	‡	'	7	G	W	g	w	ç	ù	ğ	À	À	İ		,
08	□	†	(	8	H	X	h	x	ë	ï	¿	•	Ł	İ	×	°
09	◦	‡	)	9	I	Y	i	y	ë	Ö	•	⋮	Ţ	Ÿ	Ú	..
0A	■	→	*	:	J	Z	j	z	è	Ü	~	⋮	Ł	Ţ	0	.
0B	♂	←	+	;	K	[	k	{	ï	ø	¼	Ţ	Ţ	■	Ù	!
0C	♀	Ł	,	<	L	\	l		í	é	¼	Ţ	Ţ	■	ı	³
0D	♪	↔	-	=	M	]	m	}	ı	ø	ı	ç	=	!	ÿ	²
0E	♂	▲	.	>	N	^	n	~	Ä	Ş	«	¥	Ţ	İ	-	■
0F	※	▼	/	?	O	_	o	o	Ä	ş	»	Ţ	¤	■	'	

## OCR-A (CP 876)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00					0	ø	P	ñ	p							
01			!	1	A	æ	a	q								
02			"	2	B	R	b	r		Æ						
03			#	3	C	S	c	s								
04			¢	4	D	T	d	t								
05			£	5	E	U	e	u			N					
06			&	6	F	V	f	v								
07			'	7	G	W	g	w			ø					
08	-	(	8	H	X	h	x									
09		)	9	I	Y	i	y		ø							
0A		*	:	J	Z	j	z		Ü							
0B		+	;	K	E	k	€									
0C		,	<	L	\	l			£							
0D		-	=	M	I	m	}		¥							
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0F		/	†	O	Y	o	="	Å								

## OCR-B (CP 877)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00			0	a	P	`	p									
01		!	1	A	Q	a	q	ü	»						ß	
02		"	2	B	R	b	r		Æ							
03		#	3	C	S	c	s									
04		\$	4	D	T	d	t	ä	ö							
05		%	5	E	U	e	u		Ñ						Š	
06		&	6	F	V	f	v	š	š							
07		'	7	G	W	g	w		ø						.	
08	-	(	8	H	X	h	x									
09		)	9	I	Y	i	y	ö	_	U					"	
0A		*	:	J	Z	j	z	ü		W						
0B		+	;	K	[	k	[	^								
0C		,	<	L	\	l	l	£								
0D	-	=	M	]	m	›	¥									
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0F	/	?	O	_	o	=	Å					»			'	

## Farsi (CP 1098)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P	`	p		و	ح	۰	ل	ع	ی	-
1	!	1	A	Q	a	q		ث	خ	۰	ل	ع	ک	ی
2	"	2	B	R	b	r	،	ب	خ	۰	ت	ع	ی	پ
3	#	3	C	S	c	s	،	ب	د		ت	غ	ک	-
4	\$	4	D	T	d	t	؟	ب	د	ت	-	غ	ل	•
5	%	5	E	U	e	u	=	پ	ر	فی	+	ع	ل	۱
6	&	6	F	V	f	v	آ	ت	ز	ض	ظ	غ	م	۲
7	'	7	G	W	g	w	آ	ت	ز	ط	ع	ف	م	۳
8	(	8	H	X	h	x	آ	ت	س	ط	ط	ف	ن	۴
9	)	9	I	Y	i	y	آ	ت	س	ط	ط	ل	ت	۵
A	*	:	J	Z	j	z	آ	ج	فی		ط	ر	و	۶
B	+	;	K	[	k	{	د	چ	ش	ط	ط	■	ه	۷
C	,	<	L	\	l		ء	ج	فی	ك	ط	■	ه	۸
D	-	=	M	]	m	}	آ	چ	ص	ط	=	ق	ه	۹
E	.	>	N	^	n	~	آ	خ	«	ظ	ط	ق	ه	■
F	/	?	O	_	o		ء	ح	»	ط		■	ی	



## Central Europe (CP 1250)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	nul		sp	0	@	P	`	p	€			°	Ř	Đ	ř	đ
01		dc1	!	1	A	Q	a	q		`	˘	±	Á	Ň	á	ň
02		dc2	"	2	B	R	b	r	,	˙	˘	˘	Â	Ŋ	â	ŋ
03		dc3	#	3	C	S	c	s		˝	Ł	ł	À	Ó	ă	ó
04		dc4	\$	4	D	T	d	t	˝	˝	Ŕ	˘	Å	Ô	ä	ö
05			%	5	E	U	e	u	˝	•	Ą	μ	Ł	Ö	ı	ö
06			&	6	F	V	f	v	†	˘	ı	Ŧ	Č	Ö	é	ö
07	bel		'	7	G	W	g	w	‡	˘	Š	˘	Ç	×	ç	+
08	bs can	(	8	H	X	h	x			˝	˝	˝	Č	Ř	č	ř
09	ht	)	9	I	Y	i	y	%	™	•	•	ą	É	Ů	é	ů
0A	lf	*	:	J	Z	j	z	Š	Š	Š	Š	š	Ę	Ů	ę	ú
0B	vt esc	+	;	K	[	k	{	<	>	«	»	Ė	Ů	ė	ü	
0C	ff	,	<	L	\	l		š	š	˘	˘	Ł	Ė	Ů	ė	ü
0D	cr	-	=	M	]	m	}	†	†	˘	˘	˘	ı	Ý	ı	ý
0E	so	.	>	N	^	n	~	Ž	ž	•	•	ı	ı	Ț	ı	ț
0F	si	/	?	O	_	o	del	Ž	ž	ž	ž	ž	Đ	ß	đ	˘

## Cyrillic (CP 1251)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	nul		sp	0	@	P	`	p	Ђ	ђ		°	А	Р	а	р
01		dc1	!	1	А	Q	a	q	ѓ	’	У	±	Б	С	б	с
02		dc2	"	2	В	Р	b	r	,	’	Ў	І	В	Т	в	т
03		dc3	#	3	С	Ѕ	c	s	ѓ	"	Ј	і	Г	У	г	у
04		dc4	\$	4	Д	Т	d	t	"	"	Њ	г	Д	Ф	д	ф
05			%	5	Е	U	e	u	-	•	Г	μ	Е	Х	е	х
06			&	6	Ф	V	f	v	†	-	І	П	Ж	Ц	ж	ц
07	bel		'	7	Г	W	g	w	‡	-	Ѕ	•	Э	Ч	э	ч
08	bs can	(		8	Н	X	h	x	€		Ђ	ё	И	Ш	и	ш
09	ht	)		9	І	Y	i	y	‰	™	О	№	Й	Щ	й	щ
0A	lf	*	:		Ј	Z	j	z	Љ	љ	Є	є	К	Ъ	к	ъ
0B	vt esc	+	;		К	[	k	{	<	>	«	»	Л	Ы	л	ы
0C	ff	,	<		Л	\	l		Њ	њ	¬	ј	М	Ь	м	ь
0D	cr	-	=		М	]	m	}	ќ	ќ	-	Ѕ	Н	Э	н	э
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0F	si	/	?		О	_	o	del	Ц	ц	Ї	ї	П	Я	п	я

## Latin1 Ansi Windows (CP 1252)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00				0	@	P	`	p	€			°	À	Ð	à	ð
01			!	1	A	Q	a	q		;	±	Á	Ñ	á	ñ	
02			"	2	B	R	b	r	·	´	ç	²	Â	Ò	â	ò
03			#	3	C	S	c	s	f	"	£	³	Ã	Ó	ã	ó
04			\$	4	D	T	d	t	„	”	¤	´	Ä	Ö	ä	ö
05			%	5	E	U	e	u	–	•	¥	µ	Å	Ø	a	õ
06			&	6	F	V	f	v	†	–		¶	Æ	Ö	æ	ö
07			'	7	G	W	g	w	‡	–	§		Ç	×	ç	÷
08			(	8	H	X	h	x	^	~	¨		È	Ø	è	ø
09			)	9	I	Y	i	y	%	™	©	¹	É	Ù	é	ù
0A			*	:	J	Z	j	z	Š	š	à	º	Ê	Ú	ê	ú
0B			+	;	K	[	k	{	<	>	«	»	Ë	Û	ë	û
0C			,	<	L	\	l		Œ	œ	¬	¼	Ì	Ü	ì	ü
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0E			.	>	N	^	n	~	Ž	ž	®	¾	Î	Þ	î	þ
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## Greek Windows (CP 1253)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
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1	!	1	A	Q	a	q		‘	ˆ	±	Α	Ρ	α	ρ
2	"	2	B	R	b	r	˘	’	Α	²	Β		β	ς
3	#	3	C	S	c	s	ƒ	"	£	³	Γ	Σ	γ	σ
4	\$	4	D	T	d	t	"	"	¤	´	Δ	Τ	δ	τ
5	%	5	E	U	e	u	…	•	¥	μ	Ε	Υ	ε	υ
6	&	6	F	V	f	v	†	ˉ	ı	¶	Ζ	Φ	ζ	φ
7	'	7	G	W	g	w	‡	—	§	·	Η	Χ	η	χ
8	(	8	H	X	h	x			¨	Έ	Θ	Ψ	θ	ψ
9	)	9	I	Y	i	y	%	™	©	Ή	Ι	Ω	ι	ω
A	*	:	J	Z	j	z			™	Ί	Κ	Ϊ	κ	ϊ
B	+	;	K	[	k	{	<	>	«	»	Λ	Ψ	λ	ϋ
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F	/	?	O	_	o				—	Ω	Ο	ι	ο	

## Turkish Windows (CP 1254)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
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1	!	1	À	Q	a	q		`	ı	±	Â	Ñ	á	ñ
2	"	2	B	R	b	r	·	´	¢	²	Ã	Ò	â	ò
3	#	3	C	S	c	s	ƒ	"	£	³	Ä	Ó	ã	ó
4	\$	4	D	T	d	t	„	“	¤	´	Å	Ô	ä	ô
5	%	5	E	U	e	u	…	•	¥	µ	Ä	Ö	ä	ö
6	&	6	F	V	f	v	†	—	¡	¶	Æ	Ø	æ	ø
7	'	7	G	W	g	w	‡	—	§	•	Ç	×	ç	÷
8	(	8	H	X	h	x	^	~	¨	˙	È	Ø	è	ø
9	)	9	I	Y	i	y	%	™	©	ı	É	Ù	é	ù
A	*	:	J	Z	j	z	š	š	à	º	Ê	Ú	ê	ú
B	+	;	K	[	k	{	<	>	«	»	Ë	Û	ë	ü
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## Hebrew Windows (CP 1255)

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1	!	1	A	Q	a	q		'	±	...	.	.	ב	ס
2	"	2	B	R	b	r	.	'	¢	²	...	.	ג	ע
3	#	3	C	S	c	s	ƒ	"	£	³	...	:	ד	ף
4	\$	4	D	T	d	t	"	"	¤	'	.	ן	ה	פ
5	%	5	E	U	e	u	...	•	¥	µ	..	ן	ו	ץ
6	&	6	F	V	f	v	†	—	!	¶	...	"	ז	צ
7	'	7	G	W	g	w	‡	—	§	•	—	'	ח	ק
8	(	8	H	X	h	x	^	~	"	.	—	"	ט	ך
9	)	9	I	Y	i	y	%	™	©	1	.	.	,	ש
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B	+	;	K	[	k	{	<	>	«	»	...		כ	
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## Arabic Windows (CP 1256)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
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1	!	1	A	Q	a	q	پ	`	،	±	ء	ر	ل	~
2	"	2	B	R	b	r	،	'	¢	²	آ	ز	â	=
3	#	3	C	S	c	s	ف	"	£	³	إ	س	م	/
4	\$	4	D	T	d	t	"	"	¤	'	ؤ	ش	ن	ô
5	%	5	E	U	e	u	...	•	¥	µ	ل	ى	هـ	'
6	&	6	F	V	f	v	†	-	!	¶	ئ	غ	و	/
7	'	7	G	W	g	w	‡	-	§	•	ا	x	ç	÷
8	(	8	H	X	h	x	^	ى	..	،	ب	ط	è	س
9	)	9	I	Y	i	y	%	™	©	1	ة	ظ	é	ù
A	*	:	J	Z	j	z	ث	د	•	ا	ت	ع	ê	•
B	+	;	K	[	k	{	<	>	«	»	ث	غ	ë	û
C	,	<	L	\	l		œ	œ	¬	¼	ح	-	ى	ü
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F	/	?	O	_	o		د	ن	-	?	د	ك	í	ء

## Baltic Windows (CP 1257)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P	`	p	€			°	Ą	ś	ą	ś
1	!	1	A	Q	a	q	`			±	Į	Ń	į	ń
2	"	2	B	R	b	r	˙	˙	¢	²	Ā	Ņ	ā	ō
3	#	3	C	S	c	s		"	£	³	Č	Ó	č	ó
4	\$	4	D	T	d	t	„	„	¤	´	Ķ	Ō	ķ	ō
5	%	5	E	U	e	u	…	•		μ	Ā	Ō	ā	ō
6	&	6	F	V	f	v	†	–	ı	¶	Ē	Ö	ē	ö
7	'	7	G	W	g	w	‡	—	§	·	Ē	×	ē	÷
8	(	8	H	X	h	x			Ø	ø	Č	Ū	č	ū
9	)	9	I	Y	i	y	‰	™	©	ı	Ē	Ł	ė	ł
A	*	:	J	Z	j	z			Ř	ř	Ž	Ś	ž	ś
B	+	;	K	[	k	{	<	>	«	»	Ē	Ū	ė	ū
C	,	<	L	\	l				¬	¼	Ģ	Ū	ģ	ū
D	–	=	M	]	m	}	”	–	–	½	Ķ	Ž	ķ	ž
E	.	>	N	^	n	~	˘	˘	®	¾	Ī	Ž	ī	ž
F	/	?	O	_	o		,		Æ	æ	Ł	ß	]	˙



## MAZOWIA (Polish)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	Ø	►		0	@	P	`	p	Ç	Ɖ	Ž	⋮	Ł	⋈	α	≡
01	⊕	◄	!	1	A	Q	a	q	ü	ę	Ż	⋮	⊥	⌊	β	±
02	⊙	†	"	2	B	R	b	r	é	ł	ó	⋮	⌈	⌋	Γ	≥
03	♥	!!	#	3	C	S	c	s	â	ô	ó		⌋	⋈	π	≤
04	♦	¶	\$	4	D	T	d	t	ä	ö	ń	†	—	Ł	Σ	∫
05	♣	§	%	5	E	U	e	u	à	ć	Ń	‡	†	ƒ	σ	∫
06	♠	—	&	6	F	V	f	v	ą	û	ż	‡	‡	⌈	μ	÷
07	•	‡	'	7	G	W	g	w	ç	ù	ż	⌈	‡	‡	τ	≈
08	▣	†	(	8	H	X	h	x	ê	ś	ź	‡	Ł	‡	Φ	°
09	◊	↓	)	9	I	Y	i	y	ë	ö	ŕ	‡	Ł	∫	Θ	•
0A	▣	→	*	:	J	Z	j	z	è	ù	ŕ	‡	⋈	Ł	Ω	—
0B	♂	←	+	;	K	[	k	{	ï	ś	½	⌈	⌊	▣	ó	√
0C	♀	⌊	,	<	L	\	l		í	Ł	¼	⌈	‡	▣	∞	n
0D	♪	↔	—	=	M	]	m	}	ć	Ź	;	⌈	=	▣	∅	²
0E	♂	▲	.	>	N	^	n	~	Ä	ś	«	‡	‡	▣	ε	■
0F	✱	▼	/	?	O	_	o	ô	Ą	Ź	»	⌈	±	▣	∩	

## GOST (Russian)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	»		0	@	P	`	p	±	ђ	ѓ	А	Р	а	р	Ё
01	©	«	!	1	А	Q	а	q	ђ	ѓ	ђ	Б	С	б	с	ё
02	•	†	"	2	В	Р	Ь	г	ґ	Ј	Ј	В	Т	в	т	/
03	♥	!!	#	3	С	С	с	s	ґ	Ѓ	Ѓ	Г	У	г	у	\
04	♦	¶	\$	4	Д	Т	д	t		=	-	Д	Ф	д	ф	/
05	♣	\$	%	5	Е	U	e	u	¶			Е	Х	e	х	\
06	♣	_	&	6	Ф	V	f	v	ґ	ґ	ґ	Ж	Ц	ж	ц	→
07	•	‡	'	7	Г	W	g	w	¶			З	Ч	з	ч	←
08	□	†	(	8	Н	X	h	x	Ѓ	Ѓ	Ѓ	И	Ш	и	ш	†
09	○	‡	)	9	І	Y	i	y	Ѓ			Й	Щ	й	щ	†
0A	■	→	*	:	J	Z	j	z	ґ		†	К	Ъ	к	ъ	÷
0B	♂	←	+	;	К	[	к	{	Ѓ		■	Л	Ы	л	ы	±
0C	♀	└	,	<	L	\	l		ґ		■	М	Ь	м	ь	№
0D	♪	↔	-	=	М	]	м	}	ґ		■	Н	Э	н	э	¤
0E	♠	▲	.	>	N	^	n	~			■	О	Ю	о	ю	¤
0F	✱	▼	/	?	О	_	о	о	¶	†	■	П	Я	п	я	

## TASS (Cyrillic)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	0	▶		0	@	P	`	p	A	P	a	⋮	L	ll	p	Ё
01	⊗	◀	!	1	A	Q	a	q	Б	С	б	⋮	⊥	т	с	ё
02	⊙	†	"	2	В	Р	b	r	В	Т	в	⋮	т	т	т	/
03	♥	!!	#	3	С	С	с	s	Г	У	г		†	ll	у	\
04	♦	π	\$	4	D	T	d	t	Д	Ф	д	†	-	т	ф	/
05	♣	\$	%	5	E	U	e	u	E	X	e	†	†	f	x	\
06	♣	-	&	6	F	V	f	v	Ж	Ц	ж	⋮	†	т	ц	→
07	•	‡	'	7	G	W	g	w	З	Ч	э	⋮	⋮	⋮	ч	←
08	□	†	(	8	H	X	h	x	И	Ш	и	†	ll	†	ш	†
09	○	↓	)	9	I	Y	i	y	Й	Щ	й	⋮	⋮	й	щ	†
0A	■	→	*	:	J	Z	j	z	К	Ъ	к	⋮	ll	г	ъ	÷
0B	♂	←	+	;	K	[	k	{	Л	Ы	л	⋮	т	■	ы	±
0C	♀	L	,	<	L	\	l		М	Ь	м	⋮	⋮	■	ь	№
0D	♪	↔	-	=	M	]	m	}	Н	Э	н	ll	=	■	э	№
0E	♂	▲	.	>	N	^	n	~	О	Ю	о	†	⋮	■	ю	■
0F	*	▼	/	?	O	_	o	o	П	Я	п	†	ll	■	я	■

## UKRANIAN (old version)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P	`	p	A	P	a	⋮	⋮	⋮	⋮	⋮
1	!	1	A	Q	a	q	Б	С	б	⋮	⋮	⋮	⋮	⋮
2	"	2	B	R	b	r	В	Т	в	⋮	⋮	⋮	⋮	⋮
3	#	3	C	S	c	s	Г	У	г			⋮	⋮	⋮
4	\$	4	D	T	d	t	Д	Ф	д		—	⋮	⋮	⋮
5	%	5	E	U	e	u	Е	Х	е	⋮	⋮	⋮	⋮	⋮
6	&	6	F	V	f	v	Ж	Ц	ж	⋮	⋮	⋮	⋮	⋮
7	'	7	G	W	g	w	З	Ч	з	⋮	⋮	⋮	⋮	⋮
8	(	8	H	X	h	x	И	Ш	и	⋮	⋮	⋮	⋮	⋮
9	)	9	I	Y	i	y	Й	Щ	й	⋮	⋮	⋮	⋮	⋮
A	*	:	J	Z	j	z	К	Ь	к	⋮	⋮	⋮	⋮	⋮
B	+	;	K	[	k	{	Л	Ы	л	⋮	⋮	■	⋮	⋮
C	,	<	L	\	l		М	Ь	м	⋮	⋮	■	⋮	№
D	—	=	M	]	m	}	Н	Э	н	⋮	=	■	⋮	⋮
E	.	>	N	^	n	~	О	Ю	о	⋮	⋮	■	⋮	⋮
F	/	?	O	_	o		П	Я	п	⋮	⋮	■	⋮	⋮

## KOI8-U (new version)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P	`	p	—	▤	=	⌈	ю	п	Ю	П
1	!	1	A	Q	a	q		▥		⌋	а	я	А	Я
2	"	2	B	R	b	r	Г	▦	ƒ	⌌	б	р	Б	Р
3	#	3	C	S	c	s	г	"	ё	Ё	ц	с	Ц	С
4	\$	4	D	T	d	t	Л	■	є	Є	д	т	Д	Т
5	%	5	E	U	e	u	Ј	•	ƒ	⌌	е	у	Е	У
6	&	6	F	V	f	v	⌑	"	і	І	ф	ж	Ф	Ж
7	'	7	G	W	g	w	⌒	—	Ў	Ў	г	в	Г	В
8	(	8	H	X	h	x	Т	№	⌓	⌔	х	ь	Х	Ь
9	)	9	I	Y	i	y	⌕	™	Е	±	и	ы	И	Ы
A	*	:	J	Z	j	z	†		⌕	⌕	й	э	Й	Э
B	+	;	K	[	k	{	■	»	⌕	⌕	к	ш	К	Ш
C	,	<	L	\	l		■	®	⌕	⌕	л	э	Л	Э
D	—	=	M	]	m	}	■	«	Г	Г	м	щ	М	Щ
E	.	>	N	^	n	~	■	•	Ј	⌕	н	ч	Н	Ч
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## FARSI\_1

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01		⊙	◀	!	1	A	Q	a	q	ا	ل	خ	⋮	ط	ق	ج
02		●	‡	"	2	B	R	b	r	ب	ر	د	⋮	ت	ث	ع
03		♥		#	3	C	S	c	s	س	ب	د			ط	ع
04		♠	¶	\$	4	D	T	d	t	د	ت	ر			ط	ع
05		♣	§	%	5	E	U	e	u	ه	و	د			ط	ع
06		♦	-	&	6	F	V	f	v	ف	ت	ز			ط	ع
07		•	ı	'	7	G	W	g	w	و	ت	ز			ط	ع
08		■	†	(	8	H	X	h	x	ح	ث	س			ط	ع
09		◦	↓	)	9	I	Y	i	y	ی	ث	ش			ط	ع
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## FARSI\_2

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05	♣	§	%	5	E	U	e	u	ۛ	ۛ	ر				ع	ن
06	♠	_	&	6	F	V	f	v	ۛ	ۛ	ر				ع	ن
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## Kamenicky

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01		DC1	!	1	A	Q	a	q	ü	ž	í	⋮	⊥	⌞	β	±
02			"	2	B	R	b	r	é	ž	ó	⋮	⌞	⌞	Γ	≥
03	ETX	DC3	#	3	C	S	c	s	ď	ô	ú			ℓ	π	≤
04			\$	4	D	T	d	t	ä	ö	ň		—	ℓ	Σ	∫
05	ENQ	§	%	5	E	U	e	u	ď	ó	ň	≠	†	ℓ	σ	∫
06	ACK		&	6	F	V	f	v	ř	ů	ů	≠	†	ℓ	μ	÷
07	BEL		'	7	G	W	g	w	č	ú	ô	⌞	⌞	⌞	τ	≈
08	BS		(	8	H	X	h	x	ě	ý	š	⌞	ℓ	≠	Φ	°
09	HT		)	9	I	Y	i	y	ě	ö	ř	≠	ℓ	⌞	Θ	•
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## CWI

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01		DC1	!	1	A	Q	a	q	ü	æ	í	␣	␣	␣	β	±
02			"	2	B	R	b	r	é	Æ	ó	␣	␣	␣	Γ	≥
03	ETX	DC3	#	3	C	S	c	s	â	ö	ú			␣	π	≤
04			\$	4	D	T	d	t	ä	ö	ñ		—	␣	Σ	∫
05	ENQ	§	%	5	E	U	e	u	à	ó	Ñ	␣	␣	␣	σ	∫
06	ACK		&	6	F	V	f	v	a	ü	æ	␣	␣	␣	μ	÷
07	BEL		'	7	G	W	g	w	ç	ú	ö	␣	␣	␣	τ	≈
08	BS		(	8	H	X	h	x	ê	ú	¿	␣	␣	␣	Φ	°
09	HT		)	9	I	Y	i	y	ë	ö	␣	␣	␣	␣	Θ	•
0A	LF		*	:	J	Z	j	z	è	ù	␣	␣	␣	␣	Ω	•
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## Roman-8

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4		\$	4	D	T	d	t				Ê	Ç	á	å	ö	¶
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## IN2

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01	☺	◄	!	1	A	Q	a	q	ü	æ	í	▥	└	Ð	ß	±
02	☹	↕	"	2	B	R	b	r	é	Æ	ó	▧	┘	Ê	Ô	—
03	♥	!!	#	3	C	S	c	s	â	ô	ú		┌	È	Ò	¾
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	└	—	Ê	õ	¶
05	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	†	ı	Õ	§
06	♠	_	&	6	F	V	f	v	å	û	æ	Â	ã	í	μ	÷
07	•	±	'	7	G	W	g	w	ç	ù	ø	À	Ã	î	þ	˙
08	■	↑	(	8	H	X	h	x	ê	ÿ	ı	©	ℓ	Ï	þ	°
09	○	↓	)	9	I	Y	i	y	ë	Ö	©	‡	ℓ	Ƴ	Ú	ˆ
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## Turkish

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01	☺	◄	!	1	A	Q	a	q	ü	æ	ı	Ț	⊥	〒	β	±
02	☼	†	"	2	B	R	b	r	é	Æ	ó	⌘	⌈	⌋	Γ	≥
03	♥	!!	#	3	C	S	c	s	â	ô	ú		¡	„	π	≤
04	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	†	-	£	Σ	∫
05	♣	§	%	5	E	U	e	u	à	ò	ñ	‡	†	ƒ	σ	∫
06	♠	-	&	6	F	V	f	v	a	û	Ğ	‡	†	ƒ	μ	÷
07	•	‡	'	7	G	W	g	w	ç	ù	ğ	‡	†	ƒ	τ	≈
08	■	†	(	8	H	X	h	x	ê	ı	ı	‡	„	†	Φ	°
09	◊	↓	)	9	I	Y	i	y	ë	ö	ı	‡	„	†	Θ	•
0A	◼	→	*	:	J	Z	j	z	è	ü	ı	‡	„	†	Ω	•
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## Bulgarian

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01			!	1	A	Q	a	q		˘	Y	±	Б	С	б	с
02			"	2	B	R	b	r		˘	Ъ	а	В	Т	Ѡ	м
03			#	3	C	S	c	s		˘	Э	ё	Г	У	э	у
04			\$	4	D	T	d	t	„	”	Ю	ѳ	Д	Ф	г	ф
05			%	5	E	U	e	u	–	•	Я	Ѡ	Е	Х	e	x
06			&	6	F	V	f	v		˘	Ы	П	Ж	Ц	ж	ц
07			'	7	G	W	g	w		˘	§	˘	Э	Ч	э	ч
08			(	8	H	X	h	x				у	И	Ш	и	ш
09			)	9	I	Y	i	y		™	©	®	И	Щ	ѳ	Щ
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## ISO 8859/1 (Latin 1)

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09	◊	‡	)	9	I	Y	i	y			©	ı	É	Ù	é	ù
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## ISO 8859/2 (Latin 2)

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## ISO 8859/3 (Latin 3)

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02	®	†	"	2	B	R	b	r			˘	²	Â	Ò	â	ò
03	♥	!!	#	3	C	S	c	s			£	³		Ó		ó
04	♦	¶	\$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
05	♣	§	%	5	E	U	e	u			μ	ˆ	Ç	È	é	ê
06	♠	_	&	6	F	V	f	v			Ⓐ	Ⓜ	Ĉ	Ö	ĉ	ö
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09	◦	‡	)	9	I	Y	i	y			İ	ı	É	Ù	é	ù
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## ISO 8859/4 (Latin 4)

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06	♣	_	&	6	F	V	f	v			Ł	ł	Æ	Ö	æ	ö
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08	◻	†	(	8	H	X	h	x			˝	,	Č	Ø	č	ø
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## ISO 8859/5 (Latin/Cyrillic)

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01	©	◄	!	1	À	Q	a	q				Ё	Б	С	б	с
02	®	†	"	2	В	R	b	r				Ъ	В	Т	в	т
03	♥	!!	#	3	С	S	c	s				Г	У	г	у	ѓ
04	♦	¶	\$	4	D	T	d	t				Є	Д	Ф	д	ф
05	♣	§	%	5	E	U	e	u				С	Е	Х	е	х
06	♠	—	&	6	F	V	f	v				І	Ж	Ц	ж	ц
07	•	‡	'	7	G	W	g	w				Ї	З	Ч	з	ч
08	□	†	(	8	H	X	h	x				Ј	И	Ш	и	ш
09	○	‡	)	9	I	Y	i	y				Ь	Й	Щ	й	щ
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## ISO 8859/6 (Latin/Arabic)

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02	•	‡	"	2	B	R	b	r							آ	ق
03	♥	!!	#	3	C	S	c	s							هـ	ك
04	♦	¶	\$	4	D	T	d	t							ل	ش
05	♣	§	%	5	E	U	e	u							م	ص
06	♠	–	&	6	F	V	f	v							ن	ض
07	•	‡	'	7	G	W	g	w							هـ	ط
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09	○	‡	)	9	I	Y	i	y							ى	ع
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0B	♂	←	+	;	K	[	k	{							ث	!
0C	♀	⊥	,	<	L	\	l								ع	،
0D	♪	↔	–	=	M	]	m	}							ح	–
0E	♠	▲	.	>	N	^	n	~							خ	~
0F	✱	▼	/	?	O	_	o	△							د	؟

## ISO 8859/7 (Latin/Greek)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P		p			°	î	π	û	π	
01	é	◄	!	1	À	Q	a	q			`	±	À	Þ	α	ρ
02	ê	†	"	2	Β	Ρ	b	r			´	²	Β		β	ς
03	♥	!!	#	3	Ç	Σ	c	s			£	³	Γ	Σ	γ	σ
04	♦	¶	\$	4	Δ	Τ	d	t			'	Δ	Τ	δ	τ	
05	♣	§	%	5	Ε	Υ	e	υ			ˆ	Ε	Υ	ε	υ	
06	♠	_	&	6	Φ	Ψ	f	v			!	Α	Ζ	φ	ζ	ø
07	•	ı	'	7	Γ	Ψ	g	w			§	•	Η	Χ	η	χ
08	□	†	(	8	Η	Χ	h	x			¨	Ξ	Θ	Ψ	θ	ψ
09	◊	‡	)	9	Ι	Υ	i	γ			©	Η	Ι	Ω	ι	ω
0A	■	→	*	:	Ј	Ζ	j	z				ı	Κ	İ	κ	ï
0B	♂	←	+	;	Κ	[	k	{			«	»	Λ	Ϊ	λ	ü
0C	♀	⌂	,	<	Λ	\	l	ı			¬	ϑ	Μ	ά	μ	ó
0D	♪	↔	-	=	Μ	]	m	}			-	½	Ν	έ	ν	ú
0E	♂	▲	.	>	Ν	^	n	~					Τ	Ξ	ή	ξ
0F	*	▼	/	?	Ο	_	o	◊			-	ϑ	Ο	ι	ο	

## ISO 8859/8 (Latin/Hebrew)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p			°				א	נ
01	©	◄	!	1	À	Q	a	q			±				ב	ס
02	•	†	"	2	B	R	b	r			¢	²			ג	ע
03	♥	!!	#	3	C	S	c	s			£	³			ד	ף
04	♦	¶	\$	4	D	T	d	t			¤	´			ה	פ
05	♣	§	%	5	E	U	e	u			¥	µ			ו	ץ
06	♠	—	&	6	F	V	f	v			¦	¶			ז	צ
07	•	‡	'	7	G	W	g	w			§	·			ח	ק
08	□	†	(	8	H	X	h	x			"	,			ט	ך
09	◊	‡	)	9	I	Y	i	y			•	ˆ			י	ש
0A	■	→	*	:	J	Z	j	z			×	÷			ך	ת
0B	♂	←	+	;	K	[	k	{			«	»			כ	
0C	♀	⌞	,	<	L	\	l				¬	¼			ל	
0D	♪	↔	-	=	M	]	m	}			-	½			ם	
0E	♂	▲	.	>	N	^	n	~			•	¾			מ	
0F	※	▼	/	?	O	_	o	◊			-			=	ן	

## ISO 8859/9 (Latin 5)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	ø	►		0	@	P	`	p			°	À	Ç	à	ç	
01	©	◄	!	1	À	Q	a	q			ı	±	Á	Ñ	á	ñ
02	•	†	"	2	B	R	b	r			¢	²	Â	Ò	â	ò
03	♥	!!	#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
04	♦	¶	\$	4	D	T	d	t			¤	´	Ä	Ö	ä	ö
05	♣	§	%	5	E	U	e	u			¥	µ	Å	Ö	å	ö
06	♠	—	&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
07	•	ı	'	7	G	W	g	w			§	·	Ç	×	ç	÷
08	□	†	(	8	H	X	h	x			¨	,	È	Ø	è	ø
09	◊	ı	)	9	I	Y	i	y			©	ı	É	Ù	é	ù
0A	■	→	*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
0B	♂	←	+	;	K	[	k	{			«	»	Ë	Û	ë	û
0C	♀	⌞	,	<	L	\	l				¬	¼	İ	Ü	ı	ü
0D	›	↔	-	=	M	]	m	}			-	½	Í	İ	ı	ı
0E	♂	▲	.	>	N	^	n	~			•	¾	Î	Ş	î	ş
0F	*	▼	/	?	O	_	o	◊			-	ı	Ï	ß	ï	ÿ

## ISO 8859/15 (Latin 9)

	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0		0	@	P	`	p				°	À	Ð	à	ð
1	!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ
2	"	2	B	R	b	r			ç	²	Â	Ò	â	ò
3	#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4	\$	4	D	T	d	t			€	Ž	Ä	Ô	ä	ö
5	%	5	E	U	e	u			¥	μ	Å	Ö	å	ö
6	&	6	F	V	f	v			Š	¶	Æ	Ø	æ	ø
7	'	7	G	W	g	w			§	•	Ç	×	ç	÷
8	(	8	H	X	h	x			š	ž	È	Ø	è	ø
9	)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A	*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B	+	;	K	[	k	{			«	»	Ë	Û	ë	û
C	,	<	L	\	l				¬	œ	Ì	Ü	ì	ü
D	-	=	M	]	m	}			-	æ	Í	Ý	í	ý
E	.	>	N	^	n	~			@	Ÿ	Î	Þ	î	þ
F	/	?	O	_	o				-	ı	Ï	ß	ï	ÿ

## 96 GREEK

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	NUL		SP	0	@	P	`									
01		DC1	!	1	A	Q	A	Π								
02		DC2	"	2	B	R	B	P								
03		DC3	#	3	C	S	Γ	Σ								
04		DC4	\$	4	D	T	Δ									
05			%	5	E	U	E	T								
06			&	6	F	V	Z	Y								
07	BEL		'	7	G	W	H	Φ								
08	BS CAN	(	8	H	X	Θ	X									
09	HT	)	9	I	Y	I	Ψ									
0A	LF	*	:	J	Z	K	Ω									
0B	VT ESC	+	;	K	[	A	{									
0C	FF	,	<	L	\	M										
0D	CR	-	=	M	]	N	}									
0E	SO	.	>	N	^	E	-									
0F	SI	/	?	O	_	O	DEL									SP



## Hexadecimal to Decimal Table

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
01	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
03	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
04	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
05	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
06	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
07	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
08	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
09	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
0A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
0B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
0C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
0D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
0E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
0F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

## Interfaces

This appendix provides technical information for the parallel, serial, USB and LAN interfaces.

### The Parallel Interface

The parallel interface of this printer fully supports the Centronics protocol plus the specific features requested by the EPSON and IBM printer connection in monodirectional mode and the Compatibility and Nibbles modes in bidirectional mode, plus the negotiation phases and the device identifier (as IEEE P1284).

The parallel interface is available on a specific 36 contact connector type AMPHENOL 57-40360-12-D56 or equivalent connector for 1284 Type B.

- Drive Capability  
Up to 15 feet (5 m) on AWG26 min. wire size of twisted conductors on TTL receiver. The max. reachable distance is conditioned by the host drive capability and by the noise level along the interface cable path.
- Printer Connector Type  
36 pins, 1284 Type B
- Cable Connector  
25 pin, 1284 A Type

## Signals Description

According to the IEEE - P1284 Standard, the pins assume different meanings and are identified by different names depending on the actual handshaking mode as follows:

- Compatibility mode (Centronics)

This is the lower level mode provides an asynchronous, byte-wide forward (host-to-peripheral) channel with data and status lines used according to their original definitions. The interfaces power up in the compatibility Mode Idle phase.

- Nibble Mode

This mode provides an asynchronous, reverse (peripheral-to-host) channel, under control of the host. In this mode, peripheral device to host data bytes are sent as two sequential, four-bit nibbles using the four peripheral-to-host status lines. These two modes cannot be active simultaneously.

- Byte Mode

This mode provides an asynchronous, byte-wide reverse (peripheral-to host) channel based on eight data lines of the interface for data and the control/status lines for handshaking. Byte mode is under host control and it cannot be simultaneously active with compatibility mode.

## Operating Phases

The link protocol is mainly based on the following three phases:

- Negotiation Phase

This phase is activated always by the host, only when in compatibility mode, and defines:

- whether a bidirectional link protocol can be established.
- the handshaking mode as well as the communications mode to be used.
- the device identification, if supported.

- Communication Phase

This phase is based on well defined handshaking rules which depend upon the selected link mode.

- Termination Phase

This phase is initiated by the host and returns the interface to the compatibility mode.

## Parallel Interface Signals

Description of the signals in monodirectional link:

Signal Name	Pin N°	Source	Description
STROBE	1	HOST	Clock signal which controls data transmission with its falling edge.
ACK	10	PRINTER	Negative pulsed signal indicating that the printer has received data and is ready to accept the next set of data. Also sent when the printer is switched from off-line to on-line and at the end of the initialization time. The BUSY line is always active.
DATA BIT 1 DATA BIT 2 DATA BIT 3 DATA BIT 4 DATA BIT 5 DATA BIT 6 DATA BIT 7 DATA BIT 8	2 3 4 5 6 7 8 9	PRINTER / HOST	Data 8 is the most significant bit. These are the data lines used by host or printer to transfer control code or ASCII codes.
BUSY	11	PRINTER	When high, this signal indicates that the printer cannot accept data or control codes. This signal goes high during data processing, in test and program modes, during initialization, when the buffer is full, and when a paper jam, paper end or paper size error occurs, in case of a power-on reset, the reception of a STROBE signal, while the register was not yet read, or when the INIT line is still active.
PE	12	PRINTER	When high, this signal indicates that the automatic input bin is out of paper and paper cannot be loaded from an other bin.

Signal Name	Pin N°	Source	Description
SELECT	13	PRINTER	When high, this signal indicates that the printer is on-line. It is put to low state in case of initialization or test and program mode. In IBM Proprinter emulation in low condition this signal signals a off-line request from the operator panel, paper jam, paper end or paper size errors.
AUTOFEEDX T	14	HOST	Active low level signal. Indicates whether a LF is performed after a CR or not.
GND	16	-	Logical ground level (0V).
CHASSIS GND	17	-	Frame ground.
+ 5 VDC	18	PRINTER	Is the DC voltage supplied by a component that limits the driven capability up to 100 mA.
SIGNAL GND	19-30	-	Signal ground.
INIT	31	HOST	Active low level signal. Indicates, that the printer is initializing. The BUSY signal is forced high.
ERROR	32	PRINTER	When low, this signal indicates that the printer is off-line, there is an off-line request from the operator panel, or the printer is in an error state because of: paper jam, paper end or paper size error, engine error, output bin full or cover open condition.
+5V	35	PRINTER	Pulled up to signal.
SELECTIN	36	HOST	Active low level signal. Enables the printer.

The pins 1 to 14 of the printer are connected to the pins with the same number of the parallel port of the host.

The pins 19 to 30 of the printer are connected to the pins 18 to 25 of the parallel port of the host.

The pins 31, 32 and 36 of the printer are connected respectively to the pins 16, 15 and 17 of the parallel port of the host.

1284 Mode signal names are shown with their Compatibility mode (Centronics) names in parenthesis ( ) for the bidirectional link.

Signal Name	Pin N° for Signal Wire	Pin N° for Return Wire	Source
HostClk (nStrobe)	1	19	HOST
AD1 (Data 1)	2	20	HOST in Compatibility mode and negotiation phase. NOT USED in Nibble mode.  BIDIRECTIONAL in Byte mode.
AD2 (Data 2)	3	21	
AD3 (Data 3)	4	22	
AD4 (Data 4)	5	23	
AD5 (Data 5)	6	24	
AD6 (Data 6)	7	25	
AD7 (Data 7)	8	26	
AD8 (Data 8)	9	27	
PrtClk (nAck)	10	28	PRINTER
PrtBusy (Busy)	11	29	PRINTER
AckDataReq (PError)	12	28	PRINTER
Xflag (Select)	13	28	PRINTER
HostBusy (nAutofd)	14	30	HOST

Signal Name	Pin N° for Signal Wire	Pin N° for Return Wire	Source
Peripheral Logic High (+5V)	18		PRINTER
n.a. (nInit)	31	30	HOST
nDataAvail (NFault)	32	29	PRINTER
1284 Active (NSelectIn)	36	30	
Common Logic Ground	16 and Return Wires		
Chassis Ground	17		

## Parallel Interface Signals Behaviour

HostClk /nWrite (nStrobe)	
Compatibility Mode:	Set Active low to transfer data into printer input latch. Data is valid while nStrobe is low.
Negotiation Phase:	Set active low to transfer extendibility request value into printer input latch. Data is valid on the falling edge of HostClk.
Reverse Data Transfer Phase:	Set high during Nibble Mode transfer to avoid latching data into printer. Pulsed low during Byte Mode transfers to acknowledge transfer of data from the printer. The printer shall ensure that this pulse does not transfer a new data into the printer input latch.



**AD1 ... AD8 (Data 1 ... Data 8)**

Compatibility Mode:	Forward channel data.	
Negotiation Phase:	Extendibility request value.	
Reverse Data Transfer Phase:	Nibble Mode:	NOT USED.
	Byte Mode:	Reverse channel data.

**PrtClk (nAck)**

Compatibility Mode:	Pulsed low by the printer to acknowledge the transfer of a data from the host.
Negotiation Phase:	Set low to acknowledge 1284 support, then set high to indicate that the Xflag (Select) and data available flags may be read.
Reverse Data Transfer Phase:	Used in both Nibble and Byte Modes to qualify data being sent to the host.

<b>PrtBusy (Busy)</b>		
Compatibility Mode:	Driven high to indicate that the printer is not ready to receive data.	
Negotiation Phase:	Reflects the present state of the printer's forward channel.	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits 3 then 7, then forward channel busy status
	Byte Mode:	Forward channel busy status.
Reverse Idle phase:	Forward channel busy status.	

<b>AckDataReq (PError)</b>		
Compatibility Mode:	Driven high to indicate that the printer has encountered an error in the paper path. The printer shall set nFault low whenever it sets PError high.	
Negotiation Phase:	Set high to indicate 1284 support, then follows nDataAvail (nFault).	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits then 6.
	Byte Mode:	same as nDataAvail (nFault)
Reverse Idle Phase:	Set high until host requests data transfer, then follows nDataAvail (nFault).	

Xflag (Select)		
Compatibility Mode:	Set high to indicate that the printer in on-line.	
Negotiation Phase:	The Xflag refers to extendibility flag. Used by the printer to reply to the requested extendibility byte sent by the host during the negotiation phase. The signal level is low for Nibble Mode, high for Byte Mode.	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits 1 then 5.
	Byte Mode:	Same as negotiation phase.
Reverse Idle Phase:	Same as negotiation phase.	
HostBusy (nAutofd)		
Compatibility Mode:	Set low by host to put the printer into auto-line feed mode.	
Negotiation Phase:	Set low in conjunction with 1284 Active (NSelectIn) being set high to request a 1284 mode.	
	Then set high after printer sets PtrClk (nAck) low.	
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that host can receive printer-to-host data then set high to acknowledge receipts of that nibble.
	Byte Mode:	Same as Nibble Mode to request and acknowledge bytes. Following a reverse channel transfer the interface transitions to idle phase when HostBusy (nAutoFd) is set low and printer's no data available.

Reverse Idle Phase:	Set high in response to PtrClk (nAck) low pulse to re-enter reverse data transfer phase. Is set high with 1284 Active (nSelectIn) being set low, the 1284 idle phase is being aborted and the interface returns to Compatibility Mode.
---------------------	--

Peripheral Logic High (+ 5V)

Set high to indicate that all other signals sourced by the printer are in valid state. Set low to indicate the printer is off.

#### **n.a. (nInit)**

Compatibility Mode:	Pulsed low in conjunction with 1284 Active low to reset the interface and force to return to Compatibility Mode idle phase.
---------------------	---

Negotiation Phase:	Set HIGH.
--------------------	-----------

Reverse Data Transfer Phase:	Set HIGH.
------------------------------	-----------

nDataAvail (NFault)		
Compatibility Mode:	Set low to indicate that an internal printer error has occurred.	
Negotiation Phase:	Set high to acknowledge 1284 compatibility. In Nibble or Byte Mode it is then set low to indicate printer-to-host data is available following host setting HostBusy (nAutoFd) high.	
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that printer is ready to send to host. Then used to send data bits 0 then 4.
	Byte Mode:	Used to indicate that data is available.
Reverse Idle Phase:	Used to indicate that data is available.	

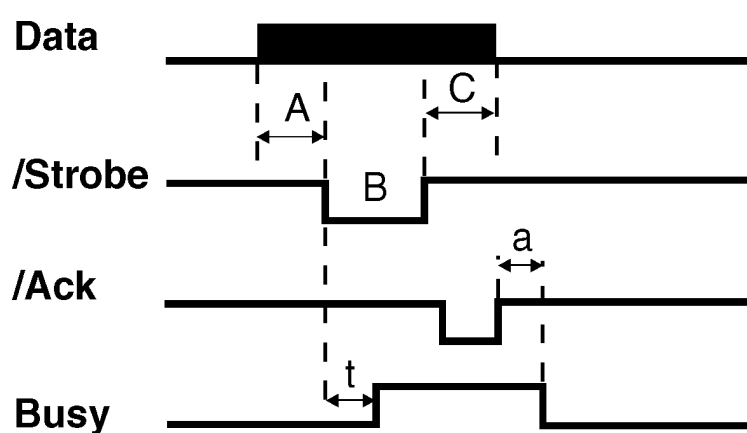
nDataAvail (NFault)		
Compatibility Mode:	Set low to indicate that an internal printer error has occurred.	
Negotiation Phase:	Set high to acknowledge 1284 compatibility. In Nibble or Byte Mode it is then set low to indicate printer-to-host data is available following host setting HostBusy (nAutoFd) high.	
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that printer is ready to send to host. Then used to send data bits 0 then 4.
	Byte Mode:	Used to indicate that data is available.
Reverse Idle Phase:	Used to indicate that data is available.	

<b>1284 Active (NSelectIn)</b>	
Compatibility Mode:	Set low by host to select printer.
Negotiation Phase:	Set high in conjunction with Host Busy being set low to request a 1284 mode.
Reverse Data Transfer Phase:	Set high to indicate that bus direction is printer to host. Set low to terminate 1284 mode and set bus direction host to printer.
Reverse Idle Phase:	Same as Reverse Data Transfer phase.

## Interface Timing

Timing and Handshaking depend upon the connection mode.

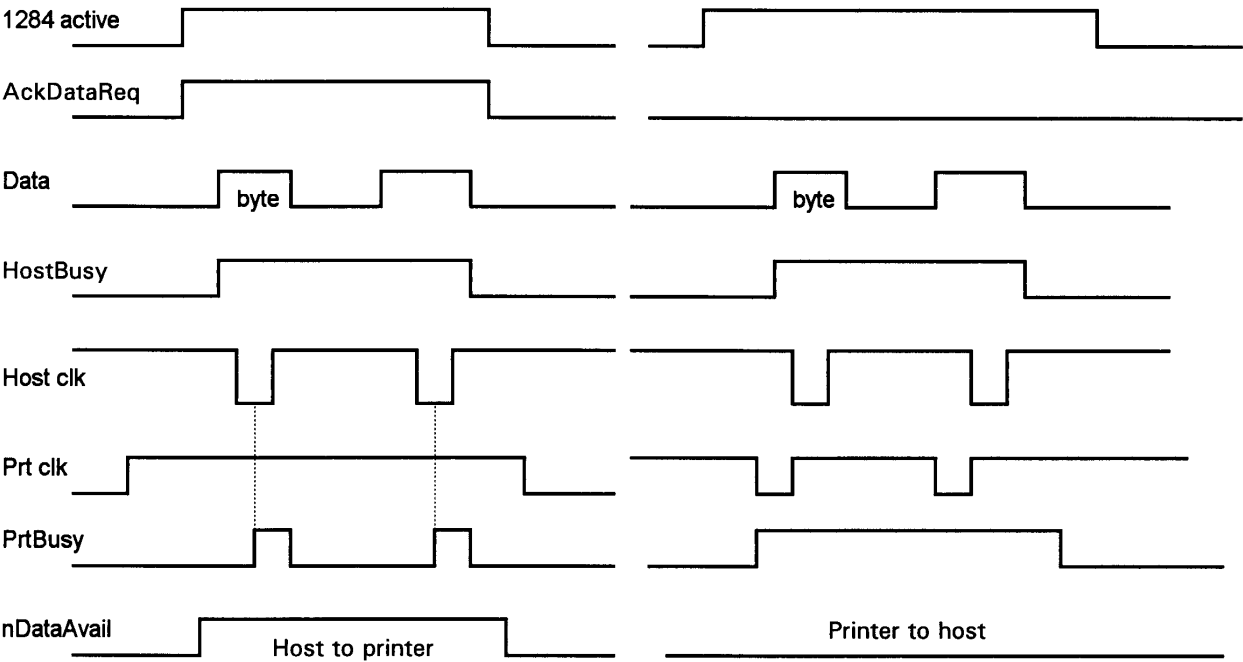
### Mode Centronics



Our Centronics mode supports the BUSY-WHILE-STROBE busy signal timing and ACK-IN-BUSY as BUSY-ACK relationship.

Legend	Time interval	Min.	Max.	all times in $\mu\text{s}$
A	Data Setup Time	1.0		
B	Strobe pulse width	1.0	500	
C	Data hold time	1.0		
t	Busy while Strobe	0.25	1.0	
a	Ack in Busy	0	2.5	

Mode IEEE 1284



FORWARD

REVERSE



## The Serial Interface

This printer provides the RS-232/C serial interface. The interface mode is selected via menu.

- **Transmission Type**  
Data is sent and received in start/stop (asynchronous) transmission.
- **Character Format**  
Each character is transmitted in the following format:  
1 START BIT + 8 DATA BITS + 1 PARITY BIT + 1 STOP BIT

The least significant bit of the data bits is sent first after the start bit. The number of data bits is selected via menu. The parity bit, when present, follows the data bits. The start bit is a logical "0" and the stop bit is a logical "1". The start and stop bits are used as character framing bits.

- **Printer Connector**  
Male DB9 or equivalent connector.
- **Drive Capability**  
Max. 50 feet (15 m) for all supported data rates.

## Serial Interface Signals

The following table lists the RS-232/C serial interface signals:

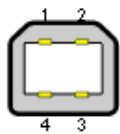
Signal Name	Pin Number	Local Connect. Source	Remote Connect. Source	Description
SIGNAL GROUND	5	-	-	Always connected to the 0 Volts of the Power Supply.
TXD	3	Printer	Printer	Transmitted Data Signal (an output from printer). A MARK condition is held during IDLE communication state. An indeterminate state is present when printer is powered off.
RXD	2	Host	Data Set	Received data signal (an input to printer).
RTS	7	Printer	Printer	Request to Send Signal (an output from printer). Active HIGH level signal. It is HIGH until the printer is powered off, then an indeterminate state is present.
CTS	8		Data Set	Active HIGH level signal indicates that the host or data set is ready to receive data from the printer.
DSR	6		Data Set	Active HIGH level signal. Indicates that the host or data set is ready to be connected to the printer and is ready for data transfer.
DCD	1		Data Set	Active HIGH level signal. Indicates that the host is transmitting or the data set is receiving the Data Carrier signal.
2 <sup>nd</sup> RTS	9	Printer		Functionally equivalent to the DTR signal.
DTR	4	Printer	Printer	Data Terminal Ready. Normally HIGH (ON). Indicates that the printer is ready to initiate a connection.

# USB Interface

## Characteristics

- Data Rate: 2.0 Full Speed (12Mbit/s)
- Type: B

## Signals



Type B

Signal Name	Pin Number	Description
VCC	1	+5 DC
D-	2	DATA -
D+	3	DATA +
GND	4	GND

## LAN Interface Port

### LAN Interface Port:

1. Ethernet 10/100Base-T Connector
2. Green 10/100Mbit/sec. Transmission Speed Led
3. Yellow Traffic Led

## LED Indicators

The led indicator modes are described in the following table:

LED	Status	Description
Green Led	Lit	Transmission speed at 10Mbit/sec.
	Unlit	Transmission speed at 100Mbit/sec.
Yellow Led	Blinks	Transmitting or receiving packets from the network.

See specific LAN documentation.

**78413023-001**

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